

**Aim:** To separate mixture of metal cations by paper chromatography.

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### Chromatography:

- Term chromatography was coined by Tswett (1906).
- Greek word → chromon → colour

Chromatography is defined as a physical method of separation of components of a mixture by distribution between two phases, viz. a stationary phase and a mobile phase.

### Application of Chromatography:

- Purification of compounds
- Identification of the components of a mixture
- Separation of a component of mixture.

### Principle of Chromatographic Separation:

A mixture is separated into its components by using a stationary phase (which may be a solid or liquid), which adsorbs the mixture and a mobile phase (which may be a liquid or gas), which on passing through the stationary phase transports the components of the mixture on to it.

- The components of the mixture are transported at different rates.
- The strongly adsorbed components of the mixture moves slowly with the moving phase, while the weakly adsorbed components move faster along the moving phase.
- As the mobile phase passes through the stationary phase, differently adsorbed components are separated.

### Types of Chromatography:

Partition  
Adsorption  
Exclusion  
Ion-exchange

### Partition Chromatography:

The mixture is separated into the constituents by partition between a stationary phase and a moving solvent (mobile phase). If the moving phase is liquid, the chromatography is called liquid-liquid chromatography (paper).

### Paper Chromatography:

Stationary phase = liquid (water adsorbed on cellulose of Whatman filter paper)

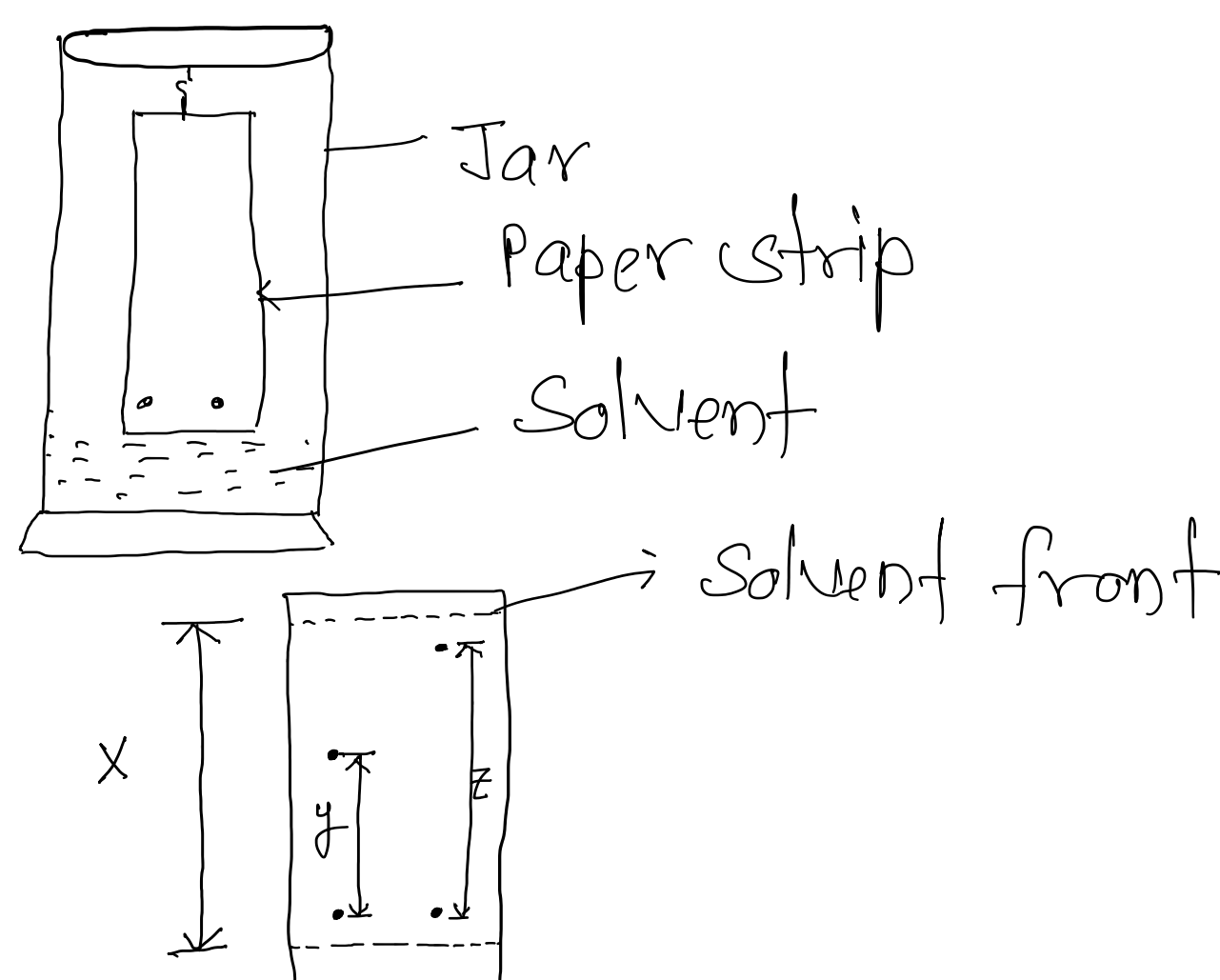
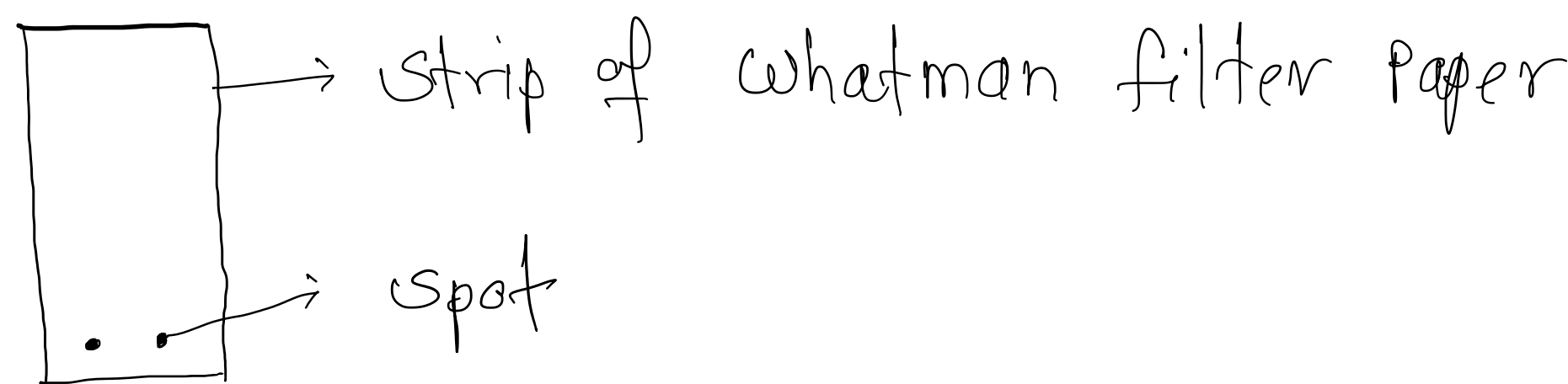
Mobile phase: solvent or mixture of solvents

- The components of the mixture to be separated travel at different rates and appear as spots at different points on the Whatmann filter paper.

### Types of Paper Chromatography:

Circular or radial  
Ascending  
Descending

### Ascending Paper Chromatography:



$$R_f = \frac{\text{Distance travelled by the cation}}{\text{Distance travelled by the solvent}}$$