I. Purpose – a concise statement of the qualitative or quantitative goals in an experiment.

II. Data – Direct qualitative or quantitative observations that require no manipulation.

	sample	mass (g)	%
A			
B			

C_4H_8O

C_4H_8O

trial trail

III. Calculations – Any mathmatical manipulation of data.

$$\% \text{ composition} = \frac{\text{mass of compound}}{\text{mass of mixture}} \times 100\%$$

$$\% \text{ yield} = \frac{\text{mass obtained}}{\text{theoretical mass}} \times 100\%$$

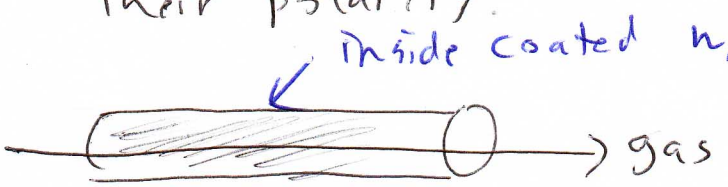
$$\% \text{ error} = \frac{\text{experimental value} - \text{theoretical value}}{\text{theoretical value}} \times 100\%$$

% error for temperature must always be calculated in Kelvin

IV. Conclusions – A summary of the results of an experiment ⇔ that addresses the goals as presented in the purpose statement.

V. Discussion –

Chromatography – A technique by which a mixture of compounds can be separated on the basis of their polarity.

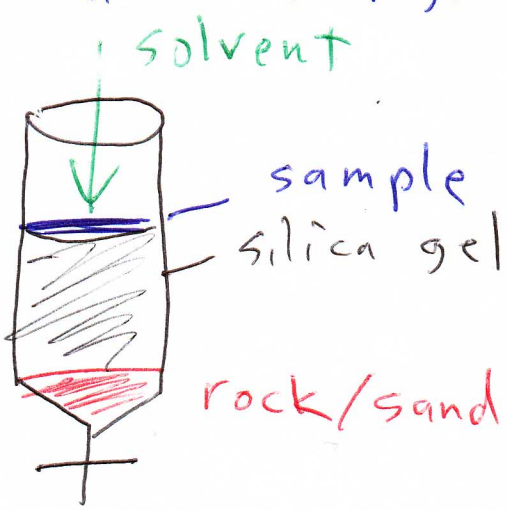


~~mobile~~ stationary phase – an immobile support that contains a compound that can separate the components of a mixture passed through it.

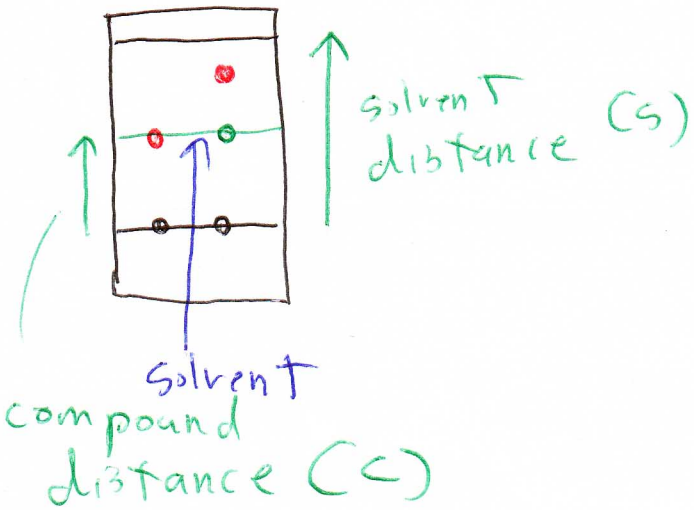
mobile phase – a gas ~~or~~ or liquid that carries the mixture to be separated through the stationary phase.

Gas chromatography (G-C) – A sample is volatilized (evaporated) and passed through a column (a tube) that is coated on the inside with some form of separatory material (stationary phase). The sample is pushed through the column by an inert gas (such as $N_{2(g)}$ or Ar) called the carrier gas (mobile phase).

Column chromatography



TLC – thin-layer chromatography

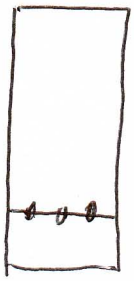


R_f – Retention factor

$$= \frac{\text{compound distance (C)}}{\text{solvent distance (S)}}$$

Preparing TLC plates

* TLC plates must always be marked in pencil, since the ink of a pen would travel with the development solvent,
* Do not press too hard with a pencil on a TLC plate since the silica gel can be scraped off,



– Draw a line across the bottom of the plate parallel to the bottom roughly 1 cm from the bottom,

– The plate is then spotted with one or more compounds.

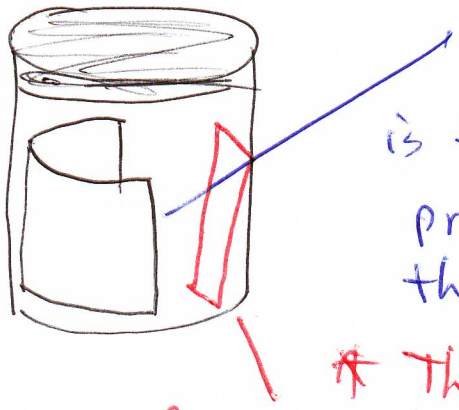
Development

TLC solvents – A solvent or solvent mixture is chosen so that it most effectively separates the components of the sample being separated.

– hexanes / ethyl acetate → more polar

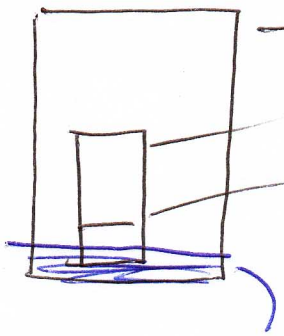
– chloroform / acetic acid

Development chamber



Filter paper - used to ensure that the interior of the chamber is fully saturated w/ solvent to prevent solvent evaporating off the plate,

* The TLC plate must not touch the filter paper, otherwise solvent could flow sideways across the plate



The level of solvent in the chamber must be below the start line,

- Once the solvent nears the top of the plate, remove the plate from the chamber and immediately mark the position of the solvent front.

Visualization

- Some forms of silica gel contain a dye that's responsive to UV light, If a spot contains a compound that absorbs UV light, the spot will appear dark, since UV light would not reach the dye. (non-destructive)
- chemical stain — the TLC plate is dipped in a compound that will react with the spots on the plate. (destructive)

p-anisaldehyde