10/13/11

#1

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.

mixture	layer	mass (g)	%
A			
B			

C_4H_8O

C_4H_8O

trial

trail

III. Calculations – Any manipulation of data

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

$$\%\text{ yield} = \frac{\text{mass of B. A. recovered}}{\text{total mass of B. A.}} \times 100\%$$

$$\%\text{ error} = \frac{\text{measured value} - \text{accepted value}}{\text{accepted value}} \times 100\%$$

% error for temperature must always be expressed using Kelvin

IV. Conclusions – A summary of the results of an experiment that addresses the goals of the experiment 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.

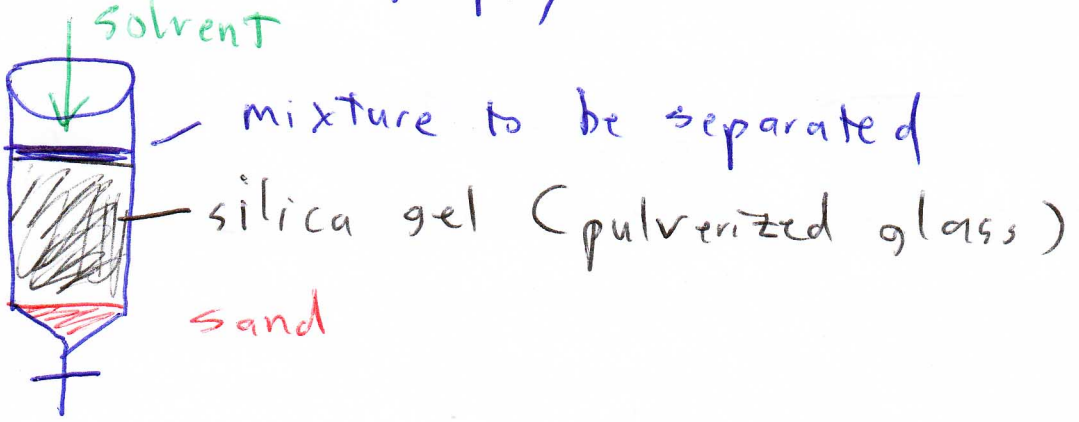
volatilized – evaporated

stationary phase – an immobile support that contains a material that can separate a mixture of compounds passed through it.

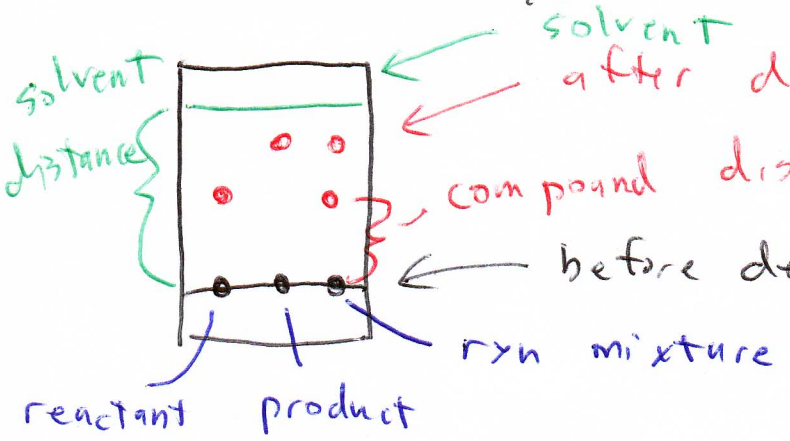
mobile phase – a gas of liquid that carries the mixture to be separated.

Gas chromatography (GC) – A sample is volatilized and passed through a column 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 argon or N_2 (mobile phase).

Column chromatography



TLC- Thin layer chromatography



$R_f \equiv$ retention factor

$$R_f = \frac{\text{compound distance}}{\text{solvent distance}}$$

Preparing TLC plates

* When writing on TLC plate, do not press too hard, or you will scratch off the silica gel
* TLC plates must only be marked in pencil, since the ink from a pen would potentially obscure the compounds being tested.

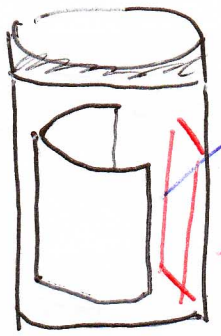
- Draw a line across the bottom of the plate parallel to the bottom,
- Each compound or mixture to be tested is spotted on the plate using a micropipette.

Development

TLC solvent systems - A solvent or mixture of solvents is chosen so that the most effective separation of the components can be achieved.

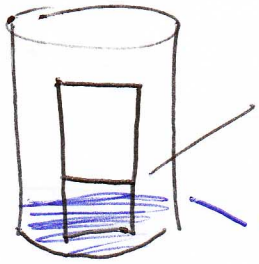
- hexanes / ethyl acetate
  non-polar polar
- chloroform / acetic acid

Development chamber



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

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

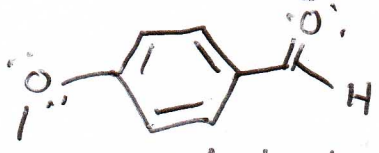


The level of the solvent in the chamber must be below the starting line of the TLC plate, otherwise the dots could simply be dissolved.

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

Visualization

- Some forms of silica gel are prepared with a UV-active dye that causes the TLC plate to glow ~~UV~~ under UV light. If a compound on the plate absorbs UV light, the compound will appear as a dark spot on the plate (since the UV light would not reach the plate). non-destructive
- chemical stain - the TLC plate is dipped into a reactive mixture that will react with the compounds on the plate and colorize them.
  - destructive



p-anisaldehyde