OCR (B) Chemistry A-Level

PAG 01 : Moles Determination
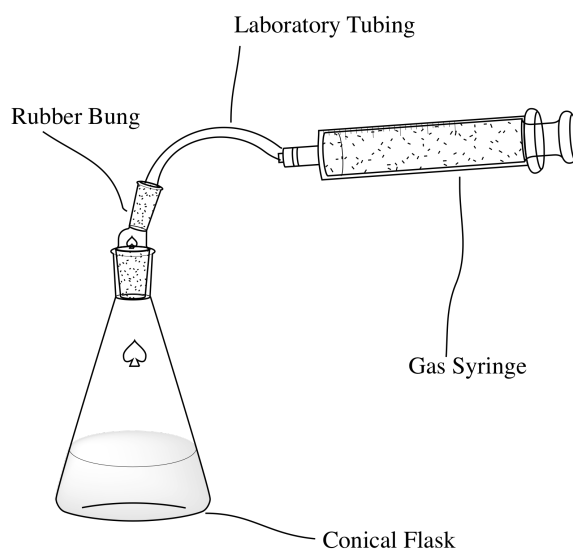
1.1 Determining composition of Hydrated Copper(II) Carbonate

Equipment
- 250 cm^3 conical flask
- Rubber bung
- 50 cm of laboratory tubing
- Mass balance
- 500 cm^3 gas syringe
- 100 cm^3 measuring cylinder
- Solid $CuCO_3 \cdot xH_2O$
- 0.5 mol dm^{-3} H_2SO_4

Method
1. Set up equipment as shown below:

Laboratory Tubing

Rubber Bung

Gas Syringe

Conical Flask

2. Weigh 2g of Copper(II) Carbonate.

3. Starting with the bung disconnected from the flask and the gas syringe all the way in, add 50 cm^3 of H_2SO_4 to the conical flask.

4. Add the $CuCO_3 \cdot xH_2O$ to the H_2SO_4 and quickly connect the bung with the tubing to the conical flask.

5. Measure the final volume of CO_2 produced from the reaction.

Calculations

- Calculate the number of moles of CO_2 produced and therefore the moles of $CuCO_3$ in the $CuCO_3 \cdot xH_2O$.

- Calculate the mass of $CuCO_3$ in the 2g sample, thus calculate the mass of water. Using these two values to calculate the value of x will give you the formula of hydrated Copper(II) Sulphate.

Errors

- Some carbon dioxide could have escaped before putting the bung on the conical flask.
  Place the Copper(II) Sulphate upright inside sample tube in the conical flask, tipping the tube over by moving the conical flask around to start the reaction.

- Not all of the Copper(II) Sulphate has reacted.
  Gently stir the mixture until no more solid can be seen.

- Some of the Copper(II) Sulphate might have been left on the weighing boat.
  Weigh the weighing boat with the copper(II) sulphate and weigh it again once adding to the H_2SO_4, use the difference as the mass of copper(II) sulphate used in the reaction.

Risk Assessment

Hazard	Risk	Correction
Solid Copper(II) Sulphate	Severe eye irritant, causes substantial eye damage. Harmful if inhaled or ingested.	Wear gloves and protective goggles, wear a lab coat if available.
H_2SO_4 solution	Corrosive. Skin, eye and lung irritant.	Wear gloves and protective goggles. Avoid spills, clear spills using sand containing sodium carbonate.