OCR (B) Chemistry A-Level

PAG 01a - Moles Determination

Determination of the composition of copper (II) carbonate

Flashcards

Describe how to set up the apparatus to measure the volume of gas produced in a reaction

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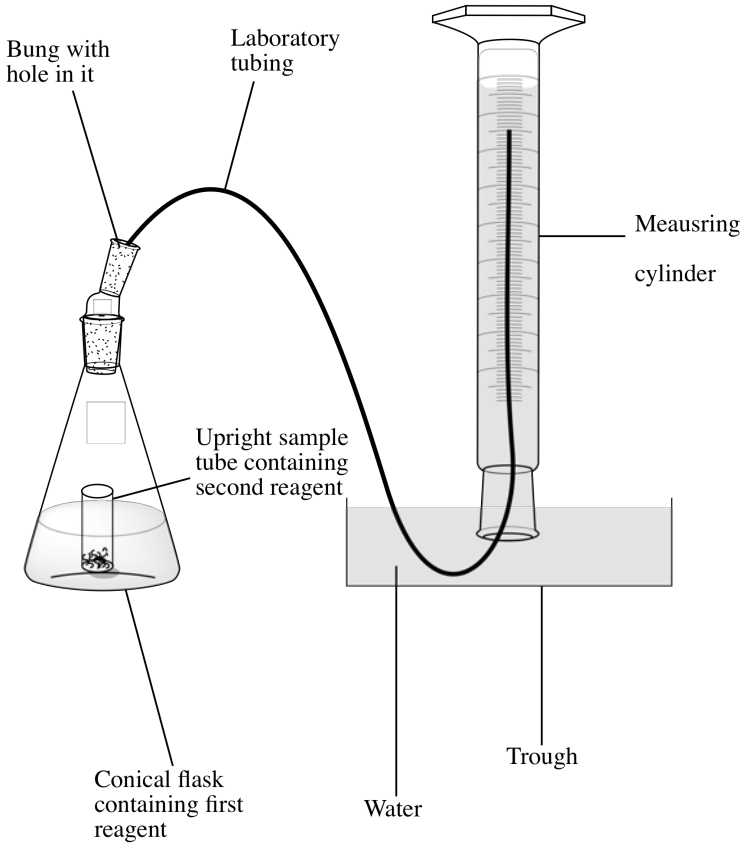
A gas syringe or an upside-down water-filled measuring cylinder in a trough of water may be used to collect the gas.



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- If at room temperature and pressure (RTP), use the equation n = V/24 where V is the volume in dm^3.
- If not at RTP, rearrange the ideal gas law PV = nRT and plug in the numbers for R (8.31), T in Kelvin, P in Pascals and V in m^3.

What is used to accurately measure mass?

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A digital balance that records mass to 2 decimal places

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$$CuCO_3 + 2HCl \rightarrow CuCl_2 + H_2O + CO_2$$

Ratio of $CuCO_3$:CO_2 is 1:1

15 moles of $CuCO_3$ reacted

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1. Record the mass of $CuCO_3.Cu(OH)_2$
2. React with acid and measure the volume of CO_2 collected. Use this to work out the number of moles of CO_2 produced (number of moles = volume in dm^3 / 24)
3. Use the ratio in the chemical equation to work out the number of moles of $CuCO_3$ that reacted.
4. Calculate the mass of $CuCO_3$ (number of moles = mass/Molar mass)
5. Calculate the percentage of mass of $CuCO_3$ in the original sample: (mass of $CuCO_3$/mass of $CuCO_3.Cu(OH)_2$) x 100

Why is it important to rapidly put the bung into the conical flask after adding sulfuric acid to $CuCO_3.Cu(OH)_2$?

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The reaction starts as soon as the acid is added so CO_2 will start to be produced. To reduce the amount of CO_2 that escapes, the bung should be inserted rapidly.

Give 3 possible sources of error when investigating the volume of gas produced in a reaction

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- Some gas could have escaped before the bung is put in the conical flask
- The reaction may be incomplete
- Some gas may dissolve in the water meaning a smaller volume would collected than was released

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- $CuCO_3.Cu(OH)_2$ is harmful if swallowed so avoid putting it near your face and wash hands after use. It is also an irritant so wear safety goggles and avoid contact with skin.
- H_2SO_4 causes skin and eye irritation so wear safety goggles and avoid contact with skin