Edexcel Chemistry International A Level

CP1 - Finding the Molar Volume of a Gas

Flashcards

Write a balanced chemical equation for the reaction between calcium carbonate and ethanoic acid

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$$CaCO_3 + 2CH_3COOH \rightarrow Ca(CH_3COO)_2 + CO_2 + H_2O$$

How can the volume of gas produced during a reaction be measured?

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Collect the gas in either:

- A gas syringe.
- An upturned water-filled measuring cylinder in a water trough.

What safety precautions should be taken when investigating the rate of reaction between ethanoic acid and calcium carbonate?

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- Wear eye protection.
- Ethanoic acid is flammable so keep the room well ventilated and remove any naked flames.
- Ensure the delivery tube isn't blocked and the volume of gas produced will not damage the tube.
- Avoid getting ethanoic acid into cuts in the skin.
- Clear up spillages and broken glassware immediately.

The volume of gas produced during a reaction is being measured using a gas syringe. Why must the bung be rapidly placed in the opening of the reaction vessel?

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To reduce the amount of gas that is lost before the bung is inserted.

How can the amount of substance be calculated using mass?

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Number of moles =

mass (g) ÷ molar mass (Mr)

Ethanoic acid reacts with calcium carbonate to form carbon dioxide. How does increasing the mass of calcium carbonate affect the volume of gas produced?

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- If calcium carbonate is the limiting reagent, increasing the mass of $CaCO_3$ will increase the volume of CO_2 produced.
- If calcium carbonate is in excess, increasing the mass of $CaCO_3$ will have no effect on the volume of CO_2 produced.

What equation links amount of substance and concentration?

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Number of moles =

concentration (mol dm^{-3}) x volume (dm^3)

How can the number of moles of a gas be calculated if its volume at room temperature and pressure is known?

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Number of moles =

$$\text{volume } (dm^3) \div 24$$

The volume of gas produced when ethanoic acid reacts with calcium carbonate is being measured using a gas syringe. What are the possible sources of error in this experiment?

The volume of gas produced when ethanoic acid react with calcium carbonate is being measured using a gas syringe. What are the possible sources of error in this experiment?

- The plunger may not be free moving (may need lubricant).
- Some gas may escape before the bung is inserted into the conical flask.
- The bung may not be airtight.
- Some $CaCO_3$ may be lost when transferring it from the weighing boat to the conical flask.

The volume of gas produced when ethanoic acid reacts with calcium carbonate is being measured using an upturned measuring cylinder. What are the possible sources of error in this experiment?

The volume of gas produced when ethanoic acid react with calcium carbonate is being measured using an upturned measuring cylinder. What are the possible sources of error in this experiment?

- Some CO_2 may dissolve in the water so the exact volume isn't measured.
- Some gas may escape before bung is inserted into the conical flask.
- The bung may not be airtight.
- Some $CaCO_3$ may be lost when transferring it from the weighing boat to the conical flask.

A common error in this experiment comes from the fact that product is lost before the bung is replaced on the reaction mixture. How can this be avoided?

A common error in this experiment comes from the fact that product is lost before the bung is replaced on the reaction mixture. How can this be avoided?

One of the reactants can be placed under an upturned container within the reaction beaker that holds the second reactant. After the bung is securely attached, the reactants can be combined by carefully knocking over the upturned container, releasing the reactant into the reaction mixture.