

OCR (A) Chemistry GCSE

PAG 8 - Measuring Rates of Reaction

Flashcards

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What apparatus are use to record mass,
time and temperature?



What apparatus are use to record mass, time and temperature?

Mass - balance

Time - stopwatch

Temperature - thermometer



Give 2 ways of measuring a volume of liquid and 1 way of measuring a volume of gas



Give 2 ways of measuring a volume of liquid and 1 way of measuring a volume of gas

Liquid - pipette or measuring cylinder

Gas - gas syringe or upside-down measuring cylinder



Why must the bung be immediately attached to the reaction vessel when measuring volume of gas produced?



Why must the bung be immediately attached to the reaction vessel when measuring volume of gas produced?

To ensure minimal gas escapes



What 2 values are needed to calculate the change in temperature?



What 2 values are needed to calculate the change in temperature?

Initial temperature

Final temperature



How can the rate of a reaction be measured (3 ways)?



How can the rate of a reaction be measured (3 ways)?

Measure change in mass

Measure the volume of gas produced
(upside-down measuring cylinder or gas syringe)

Observe colour change/ precipitate formed



When can the change in mass be used to measure the rate of a reaction? Why?



When can the change in mass be used to measure the rate of a reaction? Why?

When a gas is produced:

Gaseous molecules will be lost from the reaction vessel so fewer atoms in the reaction mixture. Mass will decrease.



How could the rate of reaction be measured if a precipitate is produced?



How could the rate of reaction be measured if a precipitate is produced?

- Place piece of paper with a black cross below the reaction vessel and observe this cross through the solution
- Measure how long it takes for the cross disappear



Why is the precipitate method not a reliable way to measure rate?



Why is the precipitate method not a reliable way to measure rate?

It is very subjective - people might disagree over the exact point when the mark disappears or the solution changes colour



How can you measure the rate of reaction if the coloured reactants form a colourless solution?



How can you measure rate of reaction if the coloured reactants form a colourless solution?

Time how long it takes for the reactants to turn colourless



How do you know that a reaction is complete?



How do you know that a reaction is complete?

Mass of reaction mixture/ volume of gas/
colour remain the same



Write an equation for the reaction
between sulfuric acid and magnesium
carbonate



Write an equation for the reaction between sulfuric acid and magnesium carbonate



List 4 ways in which the rate of a reaction can be increased



List 4 ways in which the rate of a reaction can be increased

Increase surface area of reactants

Use a catalyst

Increase temperature

Increase pressure/ concentration



What is a catalyst?



What is a catalyst?

A substance which increases the rate of a reaction without being used up



How does temperature affect the rate of a reaction? Why?



How does temperature affect the rate of a reaction? Why?

Increasing temperature increases the rate because particles have more kinetic energy so move faster (more frequent collisions) and more particles have energy above the activation energy (more collisions are successful).



How does concentration of reactants affect the rate of a reaction? Why?



How does concentration of reactants affect the rate of a reaction? Why?

Increasing concentration increases the rate because there are more particles in the same volume so more frequent collisions.



How does using a catalyst affect the rate of a reaction? Why?



How does using a catalyst affect the rate of a reaction? Why?

Using a catalyst increases the rate because it lowers the activation energy so more collisions exceed the activation energy.



How do you calculate the rate of reaction?



How do you calculate the rate of reaction?

Rate of Reaction =

$$\frac{\text{Amount of product formed or reactant used}}{\text{Time}}$$



How could you investigate how HCl concentration affects the rate of reaction when magnesium is added?



How could you investigate how HCl concentration affects the rate of reaction when magnesium is added?

Gas is produced so the volume of gas can be collected and measured

- Place the HCl in a conical flask
- Add the magnesium ribbon and quickly fit the bung and gas syringe
- Record volume of gas collected every 10 seconds
- Repeat with a different concentration of HCl
- Compare the rates for each concentration



How can you measure the rate of reaction when there is a change in mass?



How can you measure the rate of reaction when there is a change in mass?

Carry out the experiment on a mass balance:

- Measure initial mass
- Combine reactants
- Take measurements of the mass at regular intervals as the reactants react
- Rate = change in mass \div time



How can you measure the rate of reaction when a gas is given off?



How can you measure the rate of reaction when a gas is given off?

- Add reactants to a conical flask
- Immediately attach a gas syringe to the conical flask with a bung to ensure minimal gas escapes
- Take regular measurements of the volume of gas in the gas syringe
- Rate = total volume of gas produced \div time

