Edexcel Chemistry IGCSE

3.15 - Rates of Reaction

Investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid

Flashcards

How can you measure the rate of reaction between HCl and marble chips?

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- Add reactants to a conical flask
- Immediately attach a gas syringe or upside down measuring cylinder filled with water to the conical flask using a bung and capillary tube
- Take regular recordings of time and the volume of gas produced
- Rate = total volume of gas produced ÷ time

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

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To ensure minimal gas escapes

Write an equation for the reaction between hydrochloric acid and marble chips (calcium carbonate)

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$$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$$

How could you increase the surface area of marble chips?

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Turn the chips into a powder by grinding them down

How could you decrease the concentration of a sample of hydrochloric acid?

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Add a known volume of deionised water to the sample to reduce the concentration of HCl

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

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Measure the 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.

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

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- Increase surface area of reactants
- Use a catalyst
- Increase temperature
- Increase pressure/ concentration

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

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

How does surface area of reactants affect the rate of a reaction? Why?

How does surface area of reactants affect the rate of a reaction? Why?

Increasing surface area increases the rate because more particles exposed so more frequent successful collisions

How do you calculate the rate of reaction?

How do you calculate the rate of reaction?

Rate of Reaction =

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