

AQA Chemistry A-Level

RP3 - Effect of temperature on rate of a reaction

Flashcards



How can rate of reaction be measured?



How can rate of reaction be measured?

- Initial rates method- i.e. the iodine clock reaction.
- A continuous monitoring method- i.e. measuring the volume of gas released in a reaction over time.



Why does rate of reaction increase with increasing temperature?

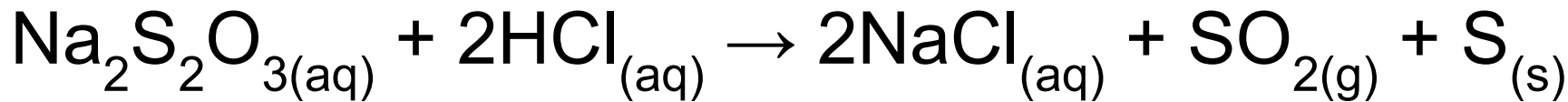


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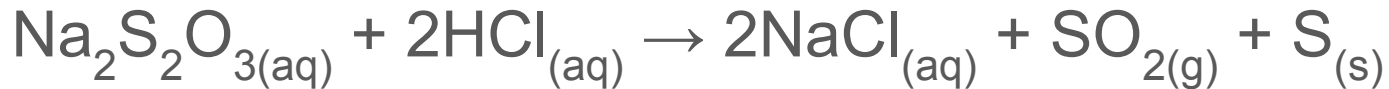
- As temperature increases, the kinetic energy of the molecules increases. This means more molecules have energy greater than the activation energy and can therefore react.
- Also as kinetic energy of molecules increases, their velocities increase resulting in more frequent and successful collisions.



How would you investigate how rate of reaction varies with temperature?



How would you investigate how rate of reaction varies with temperature?



- This reaction produces a cloudy sulfur precipitate.
- To measure rate, time how long it takes for a cross underneath the beaker to disappear, using a stopwatch (as more sulfur is produced, it will prevent you from seeing the cross).
- Repeat this at 5+ different temperatures and compare times taken.



What are some issues with this method?



What are some issues with this method?

- The disappeared cross is judged by eye and can therefore be unreliable.
- There may be a delayed reaction time with the stopwatch.
- At low temperatures the reaction may be too slow.
- There may not be enough precipitate for the cross to disappear.



How could you analyse the data?



How could you analyse the data?

- For a graph of the amount of sulfur against time, it would be a straight line at the beginning as the reaction has only just begun.
- Therefore the gradient of this straight section = rate of reaction.
- Compare the rate of reaction for each temperature. For further analysis, you could even plot a graph of rate of reaction against temperature.



What is a control variable?



What is a control variable?

A variable that is kept constant throughout the experiment.



In an experiment investigating the effect of temperature on rate of reaction, what variables will you control?



In an experiment investigating the effect of temperature on rate of reaction, what variables will you control?

- Concentrations of reactants and products.
- Volumes of reactants and products.
- Use the same beaker and cross underneath.
- Use the same person to decide when the cross has disappeared.



How can we keep a substance at a constant temperature?



How can we keep a substance at a constant temperature?

Using a water bath keeps the temperature constant. For this experiment you can set up water baths of different temperatures to see how it affects the rate of reaction.

