

WJEC (Wales) Chemistry GCSE

SP 1.5b - Investigating the Factors that
affect the Rate of the Reaction between
Hydrochloric acid and Sodium Thiosulfate

Flashcards

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Name the method used to determine the rate of reaction between Hydrochloric acid and Sodium Thiosulfate



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The disappearing cross method.



What is the disappearing cross method?



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A black cross is placed under a conical flask containing the reactants.

The cross is observed through the solution and a stopwatch times how long it takes for the cross to disappear, due to the formation of a precipitate.



Why is the disappearing cross method suitable for the reaction between Sodium Thiosulfate and Hydrochloric acid?



Why is the disappearing cross method suitable for the reaction between sodium thiosulfate and hydrochloric acid?

Sodium Thiosulfate and Hydrochloric acid are both clear solutions which react together to form Sulfur - which is a yellow precipitate. This precipitate will cause the cross to 'disappear'.



Outline the experimental procedure to investigate how the rate of reaction between Hydrochloric acid and Sodium Thiosulfate is affected by temperature



Outline the experimental procedure to investigate how the rate of reaction between hydrochloric acid and sodium thiosulfate is affected by temperature

1. Measure 25 cm^3 of 60°C sodium thiosulfate into a conical flask.
2. Record the temperature of the solution and put the conical flask on the black cross.
3. Measure 5 cm^3 of dilute hydrochloric acid into the flask. Immediately start the stopwatch whilst swirling the mixture.
4. Look down through the mouth of the flask. Stop the clock when you can't see the cross any more. Record the time taken for the cross to disappear.
5. Repeat steps 1-4, using different temperatures of sodium thiosulfate.
6. Plot the results on a graph.



How should the cross be viewed so that experimental error is kept to a minimum?



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The cross should be viewed from directly above, through the conical flask.



Why is it important that the same person determines the point at which the cross disappears?



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The point at which the cross disappears is subjective - people might disagree about the exact point. The same person should do it to ensure there is as much consistency as possible.



What are the control variables when you are investigating the effect of sodium thiosulfate temperature on the rate of reaction?



What are the control variables when you are investigating the effect of sodium thiosulfate temperature on the rate of reaction?

- Concentration of sodium thiosulfate
- Concentration of hydrochloric acid
- Volume of hydrochloric acid
- Volume of sodium thiosulfate
- Size of the flask
- Same person observing the cross



Why should the reaction between hydrochloric acid and sodium thiosulfate be carried out in a well ventilated room?



Why should the reaction between hydrochloric acid and sodium thiosulfate be carried out in a well ventilated room?

Sulfur dioxide gas is a product of the reaction. Sulfur dioxide can cause respiratory problems and irritate the nose and mouth. The experiment should be done in ventilated space to encourage the gas to move away from the top of the conical flask since this is where the reaction will be observed from.



What trend would you expect to see on the graph when the rate of reaction is plotted against temperature of sodium thiosulfate?



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As the temperature of sodium thiosulfate increases, the rate of reaction will also increase.



Explain how the increase in temperature of sodium thiosulfate will affect the rate of reaction



Explain how the increase in temperature of sodium thiosulfate will affect the rate of reaction

Increasing the temperature of sodium thiosulfate will cause the reactant particles to move faster. It also means more reactant particles have sufficient energy to react. This leads to more successful reaction collisions, increasing the rate of reaction.



Explain why it is important that the reactions at different temperatures of sodium thiosulfate are carried out using the same concentrations of reactants



Explain why it is important that the reactions at different temperatures of sodium thiosulfate are carried out using the same concentrations of reactants

Concentration also has an effect on the rate of reaction. An increase in concentration of reactants will cause an increase in the rate of reaction. Therefore, it is important that concentration is controlled during the reactions, to ensure that any trends in the results are only as a result of the changing temperature of sodium thiosulfate.

