

AQA Chemistry A-Level

RP7 - Measuring rate of a reaction

Flashcards

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What is meant by 'rate of reaction'?



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The change in concentration of reactants or products over time.



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.



What is an initial rates method?



What is an initial rates method?

The method involves measuring the initial rate of reaction for multiple different concentrations to observe how rate of reaction varies.

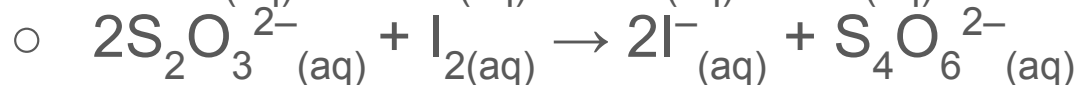
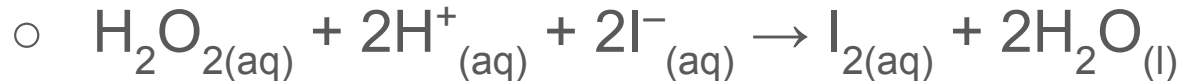


Give an example of an initial rates method.



Give an example of an initial rates method.

- The 'Iodine Clock' experiment:



- The I_2 produced reacts with all of the thiosulfate ions present. Excess I_2 remains in solution which then reacts with starch to form a blue-black solution.
- Time how long it takes for this blue-black colour to appear. You can vary $[\text{I}^-]$ to then determine the order with respect to the iodide ions.



What are the issues with this experiment?



What are the issues with this experiment?

- Some low I^- concentrations may take too long to react.
- Delayed stopwatch reactions.
- Concentrations may not be exact due to measuring apparatus.



What is a continuous monitoring method?



What is a continuous monitoring method?

This involves measuring the change in concentration of a reactant or product over time (or measuring volume of gas released) as the reaction progresses.



Give an example of a continuous monitoring method.



Give an example of a continuous monitoring method.

- Add a 6 cm strip of magnesium ribbon into a conical flask containing HCl, place a bung in the top of the flask and start the timer.
- Note down the volume of hydrogen gas collected every 15 seconds for a period of 2.5 minutes.
- Repeat for different HCl concentrations.



How would you analyse the data from
this experiment?



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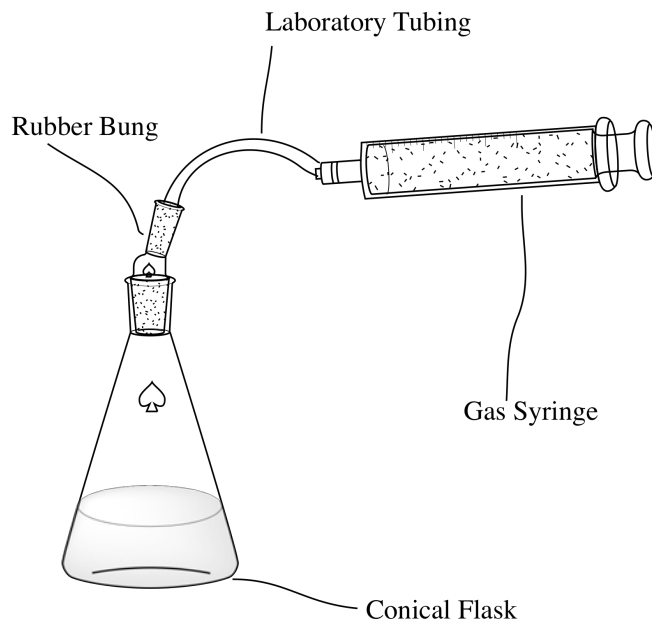
- Plot a graph of volume of hydrogen gas produced (y-axis) against time (x-axis) for each concentration of HCl. Draw a line of best fit.
- Draw a tangent at $t = 0\text{s}$ for each line.
- To deduce the rate of each reaction, calculate the gradient of each tangent.
- Compare the calculated rate values.



What should the set up for this experiment look like?



What should the set up for this experiment look like?



What are some issues with this experiment?



What are some issues with this experiment?

- Some gas may escape before the bung is added.
- The magnesium strips may be of different mass and surface area etc. which will affect the rate of reaction.



How do you prevent gas escaping?



How do you prevent gas escaping?

Place the solid reactant upright inside a sample tube in the conical flask, tipping the tube over by moving the conical flask around to start the reaction.

