

WJEC (Wales) Chemistry A-level

SP 2.2a - Investigation of a Rate of Reaction by a Gas Collection Method

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SP 2.2a - Investigation of a Rate of Reaction by a Gas Collection Method

Aim

Determination of the **rate of reaction** of hydrochloric acid and calcium carbonate.

Apparatus and Chemicals

- Access to a 3 decimal place digital balance (minimum 2 decimal place)
- Safety goggles
- 250 cm³ conical flask
- 100 cm³ gas syringe with delivery tube and rubber stopper
- 50 cm³ measuring cylinder
- Weighing boat
- Spatula
- Stopwatch
- Clamp and stand
- HCl solutions of different concentrations
- CaCO₃ powder

Safety Considerations

- ★ HCl solution - irritant



Method

1. Measure 50 cm³ of HCl solution of **known concentration** into the conical flask using the 50 cm³ measuring cylinder.
2. Measure out 2 grams of CaCO₃ powder using a weighing boat.
3. Set up the **gas syringe** in a clamp and stand.
4. Put the CaCO₃ powder into the conical flask and then quickly put the rubber stopper and delivery tube into the neck of the conical flask. At the same time, start the stopwatch.
5. Stop the stopwatch as soon as the volume of gas in the syringe reaches 100 cm³.
6. Record this result in an **appropriate table** and calculate the average rate for this reaction in cm³s⁻¹.
7. Repeat steps 2 through to 7 using a different concentration of HCl solution.
8. Use your data to plot a graph of rate (1/t) against concentration of HCl solution.



Diagram

