AQA Chemistry GCSE

Required Practicals 5

Rate of Reaction

Methods taken from the AQA Required Practical Handbook

Rate of Reaction

Investigate how changes in concentration affect the rates of reactions by both measuring the volume of a gas produced and monitoring a change in colour or turbidity (how cloudy a mixture is).

Activity 1

Aim

Investigating measurement of rate of reaction using volume of gas produced

Equipment List

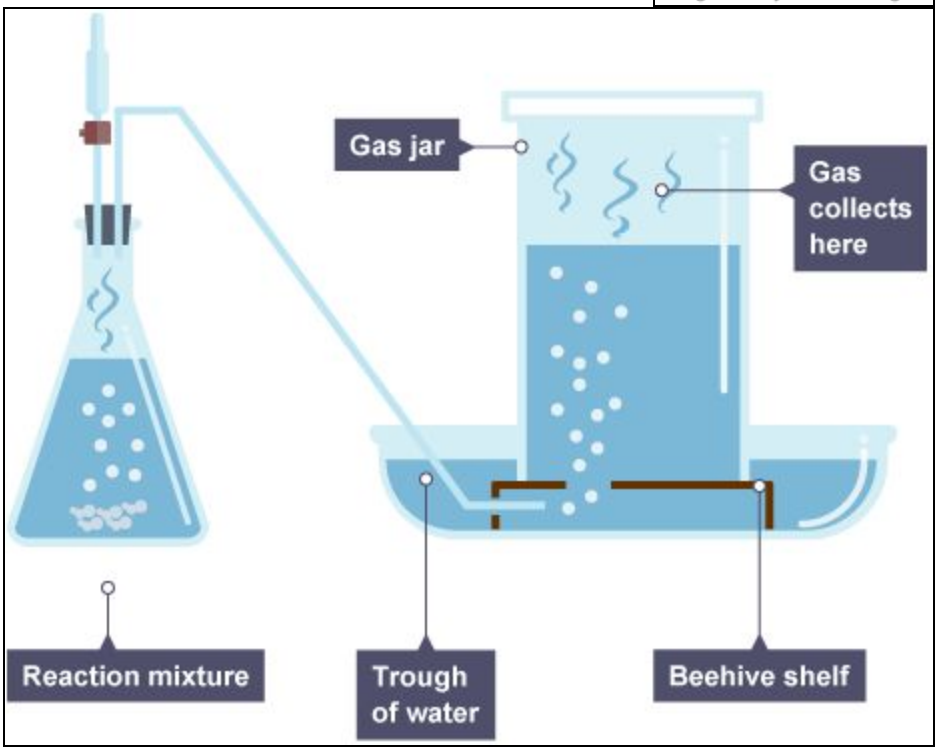
- Magnesium ribbon cut into 3 cm length
- Dilute hydrochloric acid, 1.0 M and 1.5 M
- Safety goggles
- Conical flask (100 cm^3)
- Single-holed rubber bung and delivery tube to fit conical flask
- Water trough
- Two measuring cylinders (100 cm^3)
- Clamp stand, boss and clamp
- Stopwatch

Method

1. Measure 50 cm^3 of 1.0 M hydrochloric acid using one of the measuring cylinders. Pour the acid into the 100 cm^3 conical flask.
2. Set up the apparatus as shown in one of the diagrams below.
3. Add a 3 cm strip of magnesium ribbon to the flask and quickly place the bung back into the flask. At the same time, start the stopwatch.
4. Record the volume of hydrogen gas given off every 10 seconds. Stop when no more gas is given off.
5. Repeat steps 1-4 using 1.5 M hydrochloric acid
6. Plot a graph of 'volume of gas produced' (y-axis) against 'time' (x-axis) . Draw two curves, one for each concentration of acid.

Diagram

Image courtesy of Get Revising



Activity 2

Aim

Investigating measurement of rate of reaction using colour change or turbidity.

Equipment list

- 40 g/cm^3 sodium thiosulfate solution
- 1.0 M dilute hydrochloric acid
- A conical flask (100 cm3)
- A printed black paper cross
- A stopwatch

Method

1. Measure 10 cm^3 sodium thiosulfate solution into the conical flask.
2. Dilute the solution by adding 40 cm^3 water into the conical flask making the concentration 8 g/cm^3.
3. Put the conical flask on the black cross.
4. Measure 10 cm^3 of dilute hydrochloric acid.
5. Add the acid to the flask. Then quickly at the same time, swirl the flask gently and start the stopwatch.
6. Look down through the top of the flask. Stop the clock when you can no longer see the cross and record the time taken.
7. Repeat steps 1−6 , using different volumes of sodium thiosulfate and water - 20 cm^3 sodium thiosulphate solution + 30 cm^3 water, 30 cm^3 sodium thiosulphate solution + 20 cm^3 water, 40 cm^3 sodium thiosulphate + 10 cm^3 water).

   This will change the concentration of sodium thiosulfate.
8. Repeat steps 1-7 twice more.
9. Calculate the mean time for each of the sodium thiosulfate concentrations.

Safety Precautions

- Wear safety glasses.
- Take care when using glassware.