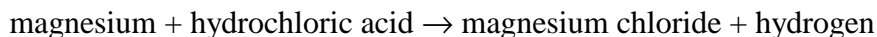


The reaction between magnesium and hydrochloric acid

Aims

Magnesium and dilute hydrochloric acid react together according to the equation below:



The hydrogen produced makes the reaction mixture effervesce (fizz).

The faster the reaction, the shorter the time taken for the effervescence to stop.

You will study the effect of changing the concentration of hydrochloric acid on the rate of reaction.

Apparatus

Goggles

Stop clock

5 x 1cm pieces of magnesium

Bench mat

100cm³ beaker

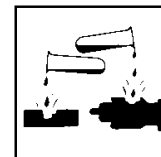
2.0M hydrochloric acid

Teat pipette

25cm³ measuring cylinder



Eye protection
must be worn



Method

1. Measure 25cm³ of 2.0M hydrochloric acid and put it into the beaker.
2. Put one piece of magnesium into the beaker of hydrochloric acid, and time the reaction. Record the reaction time in a table like Table 1 (below).

Concentration of acid (M)	Reaction time (s)	1/time (s ⁻¹)
2.0		
1.6		
1.2		
0.8		
0.4		

Table 1

3. Empty the beaker and rinse it out. Repeat the experiment using the other volumes of hydrochloric acid and water shown in Table 2.

Volume of hydrochloric acid (cm ³)	Volume of water (cm ³)	Concentration of acid (M)
20	5	1.6
15	10	1.2
10	15	0.8
5	20	0.4

Table 2

Analysis of results

1. Work out **1 ÷ time** for each reading, and write the answer in the third column of your Results table.
2. Plot a graph of 1/time (vertical axis) against the concentration of hydrochloric acid (horizontal axis). **Note:** it sometimes helps to multiply each number by 1000 to get easier numbers to plot on your graph.
3. Explain what your results tell you about the reaction between magnesium and hydrochloric acid.