

Conservation of mass

Experiment 1: the reaction of magnesium with oxygen

Equipment (per group)

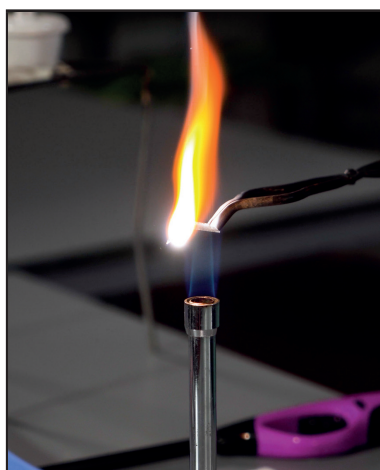


- Magnesium strips 3 cm (1 or 2 to demonstrate magnesium burning in oxygen)
- Magnesium strips 15 cm (2 or 3 to place in crucible, allowing for repeats)
- Crucible and lid (ceramic or metal — or alternative method using steel bottle tops, see CLEAPSS PP063)
- Tongs
- Pipe clay triangle
- Tripod
- Bunsen burner
- Mass balance measuring to 2 decimal places (0.01 g)
- Matches and splints

Safety equipment: safety spectacles

Preparation

Clean the magnesium ribbon using sandpaper if slightly oxidised (will appear white) for best results.

Equipment set-up and tips

		
Do not look directly at the flame when burning magnesium.	Lift lid every minute to allow oxygen in – do not allow product to escape (product includes smoke).	Leave the crucible to cool for a few minutes before measuring final mass – keep the lid on.

Safety

Read our [standard health & safety guidance](#) and carry out a risk assessment before running any live practical.

Refer to SSERC/CLEAPSS Hazcards and recipe sheets.

Hazard classification may vary depending on supplier.

Chemical supplied for the practical

Magnesium solid
Mg (s)



DANGER
Flammable

Disposal

Scrap the magnesium oxide left in the crucible using a spatula and dispose of as general waste.

Crucibles can be soaked for a few hours or overnight in 0.5 mol dm⁻³ hydrochloric acid solution if any solid remains at the bottom, rinse thoroughly using distilled water.

Porcelain crucibles tend to crack easily if re-used, consider using stainless steel crucibles instead or the alternative method from CLEAPSS using bottle caps (PP063 <http://science.cleapss.org.uk/Resource-Info/PP063-Finding-the-Formula-of-Magnesium-Oxide.aspx>)

Experiment 2: the reaction of calcium carbonate with hydrochloric acid

Equipment (per group)



- 100 ml conical flask
- 25 ml measuring cylinder
- Mass balance measuring to two decimal places (0.01 g)
- Sieve (for clearing up)

Safety equipment: safety spectacles

Preparation

- 1 mol dm⁻³ hydrochloric acid solution
- Calcium carbonate marble chips – medium size (5 mm) – between 1.50 to 2.00 g

Equipment set-up and tips



	
Add the hydrochloric acid to the conical flask and measure the mass of all reactants.	Swirl the flask a few times and leave until there are no more bubbles.
Note the amount of chips shown in the video may be more suitable for demonstration.	

Safety

[Read our standard health & safety guidance](#) and carry out a risk assessment before running any live practical.

Refer to SSERC/CLEAPSS Hazcards and recipe sheets.

Hazard classification may vary depending on supplier.

Chemical supplied for the practical	Preparation
Calcium carbonate chips Not classified as hazardous	
Hydrochloric acid solution – 1.0 mol dm ⁻³ HCl (aq) Not classified as hazardous	Hydrochloric acid concentrated solution HCl (aq) MW= 36.46 g mol ⁻¹   DANGER Causes severe skin burns and eye damage May cause respiratory irritation

Disposal

The hydrochloric acid is neutralised by the excess of calcium carbonate so the solution can be disposed directly in the sink.

Any acid that might be used can be diluted down to 0.1 mol dm⁻³ poured down a foul-water drain.

Use a sieve to retrieve any unreacted marble chips and dispose of as general waste.