

Finding the formula of magnesium oxide

Aims

When magnesium is heated in air, it reacts with oxygen. During this **oxidation** reaction, magnesium oxide is produced. This increases the mass. If we know the mass of magnesium at the start, and the mass of magnesium oxide produced at the end, we can work out the mass of oxygen which has been combined with the magnesium. We can use these masses to work out the **formula** of magnesium oxide.



Eye protection
must be worn

Apparatus

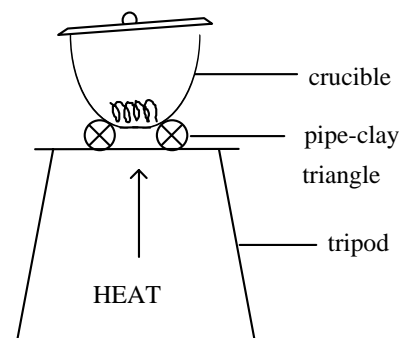
Goggles	Crucible and lid
Bench mat	Tongs
Tripod	10cm length of magnesium ribbon
Bunsen burner	Small piece of sandpaper
Pipe-clay triangle	Digital balance

Methods

1. Weigh the empty crucible with its lid, and write down the result in a table.
2. Clean the piece of magnesium ribbon with sandpaper, then coil it loosely around a pencil. Put the magnesium ribbon into the crucible and put the lid on. Weigh the crucible, lid, and magnesium together, and write down the result in your table.
3. Put the crucible onto the pipe-clay triangle. Leave the lid slightly ajar to allow air into the crucible. Heat gently for a minute, then strongly. Continue heating until the reaction has finished (the magnesium will glow at first, then look a bit like a furry grey-black caterpillar – it really will!).
4. Turn the Bunsen burner off, and allow the crucible to cool for a few minutes. Reweigh the crucible with its lid and contents, and write down the result in your table.

Results (suggested table only – do not write on this sheet)

Objects	Mass (g)
crucible + lid	
crucible + lid + magnesium	
crucible + lid + contents after reaction	



Conclusions

1. Work out the mass of magnesium used in the experiment.
Apparatus to oxidise magnesium
2. Work out the mass of magnesium oxide formed.
3. Use your answers to (1) and (2) to work out the mass of oxygen gained.
4. Look up $A_r(\text{Mg})$ and $A_r(\text{O})$. Use these numbers, and the masses worked out in parts (1) and (3), to work out the number of moles of magnesium and oxygen involved.
5. Finally, work out your formula for magnesium oxide. You will probably find that the formula has a complicated number in it – round it off to 1 decimal place.
6. The accepted formula is MgO . How close did you get?
Explain why your formula might be different from the accepted one.