

Exercise walk-through

Formulae ■ 3.1

eXercise

You must be able to

- work out an ionic formula by balancing charges
- balance a symbol equation and add state symbols
- write a simple ionic equation (leaving out spectator ions)

Method — Formulae and balancing

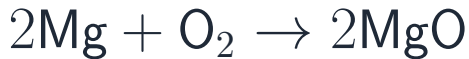
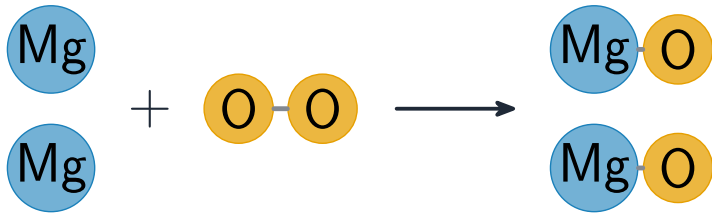
Ionic (acid + alkali): $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$.



the charge numbers cross over
to become the subscripts (then
simplify if they share a factor)

Al³ and O² charges crossing over to give Al O

Method — Formulae and balancing



2 Mg and 2 O on each side: balanced

$2\text{Mg} + \text{O} \rightarrow 2\text{MgO}$, balanced both sides

Practice 2.1 ■ 1 mark

Give the formula of the compound formed from Mg^{2+} and Cl^- .

Solution 2.1

Method: Formulae and balancing

Worked steps

MgCl_2 **B1**.

Practice 2.2 ■ 1 mark

State what the symbol (*aq*) means.

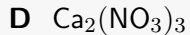
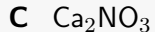
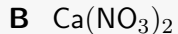
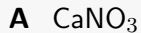
Solution 2.2

Worked steps

aqueous — dissolved in water **B1**.

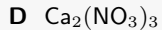
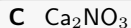
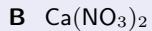
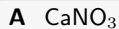
Exam-style 3.1 ■ 1 mark

The formula of the ionic compound from Ca^{2+} and NO_3^- is:



Solution 3.1

Method: Formulae and balancing

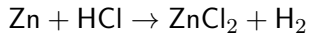


Worked steps

B. One Ca^{2+} needs two NO_3^- : $\text{Ca}(\text{NO}_3)_2$.

Exam-style 3.2 ■ 3 marks

Balance the equation, adding state symbols:



Solution 3.2

Method: Formulae and balancing

Worked steps

$\text{Zn(s)} + 2\text{HCl(aq)} \rightarrow \text{ZnCl}_2\text{(aq)} + \text{H}_2\text{(g)}$ **M1** **A1** **A1** *balance with the 2, formulae, state symbols.*

Exam-style 3.3 ■ 3 marks

Write the ionic equation for the neutralisation of a strong acid by a strong alkali, and name the spectator ions when NaOH reacts with HCl.

Solution 3.3

Method: Formulae and balancing

Worked steps

$\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$ **M1** **A1**; the spectator ions are Na^+ and Cl^- **A1**.