

3.1 Formulae

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS formula 化学式 • compound 化合物 • symbol equation 化学方程式
 • aqueous 水溶液 • ionic equation 离子方程式

Objective

Build the skills to answer exam questions on **formulae** 化学式 — working out ionic formulae from charges, **balancing equations** 配平方程式, **state symbols** 状态符号, and **ionic equations** 离子方程式.

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)

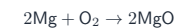
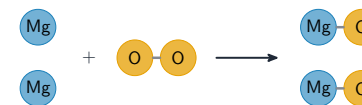
1 Worked examples

■ Formulae and balancing



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

The ion charges cross over to give the formula (here Al₂O₃)



2 Mg and 2 O on each side: balanced

A balanced equation has the same number of each atom on both sides

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

2 Practice

2.1 Give the formula of the compound formed from Mg^{2+} and Cl^- . [1]

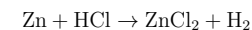
2.2 State what the symbol (*aq*) means. [1]

3 Exam-style questions

3.1 The formula of the ionic compound from Ca^{2+} and NO_3^- is: [1]

- A CaNO_3
- B $\text{Ca}(\text{NO}_3)_2$
- C Ca_2NO_3
- D $\text{Ca}_2(\text{NO}_3)_3$

3.2 Balance the equation, adding state symbols:



[3]

3.3 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. [3]

Solutions

2.1 MgCl_2 .

2.2 aqueous — dissolved in water.

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

3.2 $\text{Zn}(s) + 2\text{HCl}(aq) \rightarrow \text{ZnCl}_2(aq) + \text{H}_2(g)$.

3.3 $\text{H}^+(aq) + \text{OH}^-(aq) \rightarrow \text{H}_2\text{O}(l)$; the spectator ions are Na^+ and Cl^- .