IGCSE CHEMISTRY • HOLIDAY HOMEWORK 假期作业

3 Formulae and equations – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
Stoichiometry	化学计量			
formulae	化学式			
equations	化学方程式			
molecular formula	分子式			
empirical formula	实验式			
ratio	比例			
ionic compound	离子化合物			
symbol equation	化学方程式			
balanced	配平			
state symbols	状态符号			
aqueous	水溶液			

Recall

Stoichiometry 化学计量 is about the **amounts** of substances in a reaction. It starts with writing **formulae** 化学式 and balancing **equations** 化学方程式.

- A formula shows which atoms are in a substance, and how many.
- An equation shows reactants changing into products.

Nothing here is hard — it just needs careful counting.

New ideas

Read these first, then do the Practice.

1 Formulae

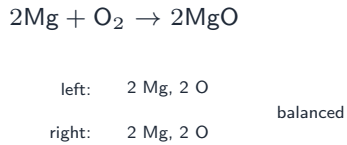
- the **molecular formula** 分子式 gives the actual number of each atom (glucose: $C_6H_{12}O_6$).
- the **empirical formula** 实验式 gives the simplest **ratio** 比例 (glucose: CH_2O).

For an **ionic compound** 离子化合物, balance the charges so the compound is neutral — the charges **cross over** to become the numbers.

2 Balancing equations

A **symbol equation** 化学方程式 must be **balanced** 配平 — the **same number of each atom** on both sides:

$$2Mg + O_2 \rightarrow 2MgO$$



■ 3 State symbols

Add **state symbols** 状态符号 in brackets: (s) solid, (l) liquid, (g) gas, (aq) **aqueous** 水溶液.

$$\mathrm{Zn}(s) + 2\mathrm{HCl}(aq) \rightarrow \mathrm{ZnCl_2}(aq) + \mathrm{H_2}(g)$$

Watch out: when balancing you may change only the **big numbers in front** (coefficients) — never the small subscripts inside a formula, as that would change the substance. For an ionic formula the charges **cross over** to become the subscripts.

Practice

Try these in order.

3.1 State the difference between a *molecular* and an *empirical* formula. [2]

3.2 Work out the formula of the compound of $\mathrm{Mg^{2+}}$ and $\mathrm{Cl^{-}}$. [2]

3.3 Balance this equation: $\mathrm{H_2} + \mathrm{O_2} \rightarrow \mathrm{H_2O}$. [2]

3.4 What does the state symbol (aq) mean? [1]

3.5 Write the symbol equation (with state symbols) for solid zinc reacting with hydrochloric acid to give zinc chloride solution and hydrogen gas. [2]

3.6 Challenge. Balance this equation: $\mathrm{Fe} + \mathrm{O_2} \rightarrow \mathrm{Fe_2O_3}$. [2]