

4.7 Types of Chemical Reactions

Name: _____ Class: _____ Date: _____

Total: 11 marks

KEY WORDS combustion 燃烧 • decomposition 分解 • synthesis 化合 • acid 酸 • base 碱

Objective

Build the skills to answer exam questions on the **types of chemical reactions**.

You must be able to:

- recognise **synthesis** 化合, **decomposition** 分解, **combustion** 燃烧, **precipitation**, and **acid-base** reactions
- predict products for simple cases
- classify a given equation

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ The main reaction types

- **Synthesis (combination):** $A + B \rightarrow AB$.
- **Decomposition:** $AB \rightarrow A + B$.
- **Combustion:** a fuel + $O_2 \rightarrow CO_2 + H_2O$.
- **Precipitation:** two solutions form an insoluble solid.
- **Acid-base (neutralization):** acid + base $\rightarrow$ salt + water.

■ Recognising by pattern

Count reactants and products: one product = synthesis; one reactant = decomposition; O_2 + a hydrocarbon = combustion; two solutions $\rightarrow$ a solid = precipitation.

■ A worked classification

$2Mg + O_2 \rightarrow 2MgO$: two reactants, one product $\rightarrow$ **synthesis** (also a combustion of a metal).

■ Combustion products

Complete combustion of a hydrocarbon always gives CO_2 and H_2O . $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$.

2 Practice

Now apply the methods above.

2.1 Classify $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$. [1]

2.2 Classify $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$. [1]

2.3 What are the products of complete combustion of a hydrocarbon? [2]

3 Exam-style questions

3.1 A reaction $\text{A} + \text{B} \rightarrow \text{AB}$ is a [1]

A	B
C	D

A decomposition

B synthesis

C combustion

D precipitation

3.2 Classify each reaction:

(a) $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ [1]

(b) $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$ [1]

(c) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$ [1]

3.3 Write the balanced equation for the complete combustion of ethane, C_2H_6 . [3]