

16 Alcohols – 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)		
ethanol	乙醇	_____	_____	_____
alcohol	醇	_____	_____	_____
primary	伯	_____	_____	_____
secondary	仲	_____	_____	_____
tertiary	叔	_____	_____	_____
dehydration	脱水	_____	_____	_____
carboxylic acid	羧酸	_____	_____	_____
ester	酯	_____	_____	_____
oxidation	氧化	_____	_____	_____

Recall

At IGCSE you met **ethanol** 乙醇, the alcohol in drinks and fuel. An **alcohol** 醇 has the **–OH** (hydroxyl) functional group.

- The **–OH** group gives the family its reactions.
- Like halogenoalkanes, alcohols come in three classes.

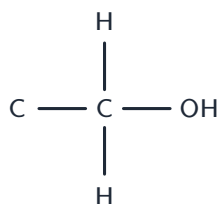
Nothing here is harder than IGCSE — it just adds the reactions.

New ideas

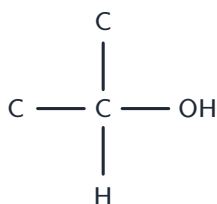
Read these first, then do the Practice.

■ 1 Three classes

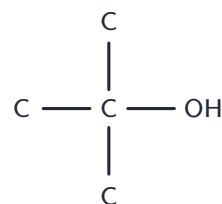
An alcohol is **primary** 伯, **secondary** 仲 or **tertiary** 叔, set by how many carbons are joined to the carbon holding the **–OH**.



primary



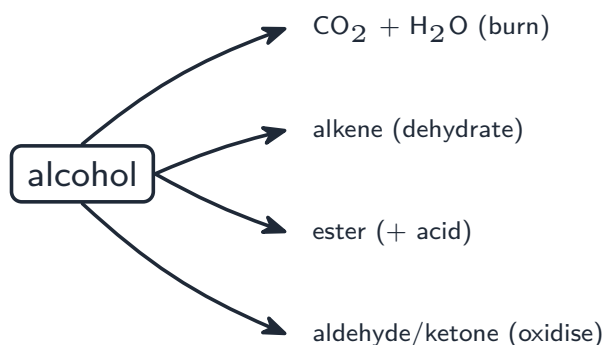
secondary



tertiary

■ 2 Reactions of alcohols

- **combustion** — burn in oxygen $\rightarrow \text{CO}_2 + \text{water}$.
- **with sodium** — react with sodium metal $\rightarrow$ hydrogen + a sodium alkoxide.
- **dehydration** 脱水 — hot Al_2O_3 (or conc. acid) removes water $\rightarrow$ an **alkene**.
- **esterification** — with a **carboxylic acid** 羧酸 (conc. H_2SO_4 catalyst) $\rightarrow$ an **ester** 酯.
- **oxidation** 氧化 — with acidified $\text{K}_2\text{Cr}_2\text{O}_7$ (Part 2).



Watch out: an alcohol's class (primary/secondary/tertiary) is set by the number of carbons on the C–OH carbon — exactly like halogenoalkanes — and it controls the product of oxidation (Part 2).

Practice

Try these in order.

16.1 Name the functional group of an alcohol. [1]

16.2 What decides whether an alcohol is primary, secondary or tertiary? [1]

16.3 Name the products when an alcohol reacts with sodium metal. [2]

16.4 What is formed when an alcohol is dehydrated? [1]

16.5 An alcohol reacts with a carboxylic acid (with a sulfuric acid catalyst). Name the product. [1]

16.6 Write the products of the complete combustion of ethanol. [1]

16.7 Challenge. Propan-1-ol and propan-2-ol share the formula C_3H_8O . Classify each as primary or secondary, and explain. [2]
