11 Alcohols, acids and polymers – Part 2

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)		
functional group	官能团			
alcohols	醇			
carboxylic acids	羧酸			
ethanol	乙醇			
fermentation	发酵			
yeast	酵母			
glucose	葡萄糖			
hydration	水合			
solvent	溶剂			
Ethanoic acid	乙酸			
metals	金属			
carbonates	碳酸盐			
bases	碱			
oxidation	氧化			
ester	酯			

English	中文	Write it 3 times (English)		
polymer	聚合物			
monomers	单体			
addition polymerisation	加聚			
poly(ethene)	聚乙烯			
repeat unit	重复单元			
plastics	塑料			
landfill	填埋			

Recall

A **functional group** 官能团 is the part of a molecule that gives it its reactions. Two families share the spotlight here:

- **alcohols** 醇 have the –OH group;
- **carboxylic acids** 羧酸 have the –COOH group.

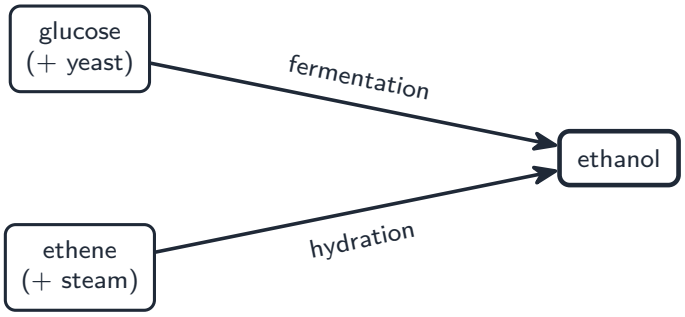
New ideas

Read these first, then do the Practice.

■ 1 Alcohols

The alcohol to know is **ethanol** 乙醇. There are two ways to make it:

Method	What happens	Note
fermentation 发酵	**yeast** 酵母 turns **glucose** 葡萄糖 into ethanol + CO_2	renewable sugar; slow
hydration 水合 of ethene	steam adds to ethene (acid catalyst)	fast and pure; uses petroleum



Ethanol is used as a **fuel** (it burns well) and as a **solvent** 溶剂 (it dissolves many things).

2 Carboxylic acids

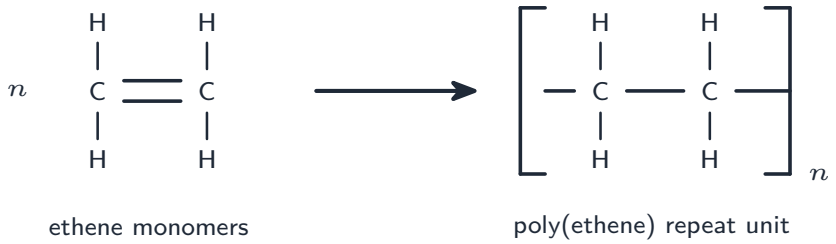
Ethanoic acid 乙酸 is the one to know. Like other acids, it reacts with:

- **metals** 金属 → salt + hydrogen;
- **carbonates** 碳酸盐 → salt + water + carbon dioxide;
- **bases** 碱 → salt + water.

It is made by the **oxidation** 氧化 of ethanol. When a carboxylic acid reacts with an alcohol (acid catalyst), it makes an **ester** 酯.

3 Polymers

A **polymer** 聚合物 is a very large molecule built from many small **monomers** 单体. In **addition polymerisation** 加聚, many unsaturated monomers (with C=C) join up with no other product. Many ethene monomers join to make **poly(ethene)** 聚乙烯. The small part that repeats along the chain is the **repeat unit** 重复单元.



Many **plastics** 塑料 do not break down, so they build up in **landfill** 填埋 sites and harm sea life — a real environmental problem.

Watch out: fermentation (yeast on glucose) is renewable but slow; **hydration of ethene** (steam + catalyst) is fast and pure but uses petroleum — know one advantage of each. In **addition polymerisation** the monomers must have a C=C, and there is **no** other product.

Practice

Try these in order.

11.6 Name the functional group in (a) an alcohol and (b) a carboxylic acid. [2]

11.7 Name the two methods used to make ethanol. [2]

11.8 Give two uses of ethanol. [2]

11.9 Ethanoic acid reacts with magnesium carbonate. Name the three products. [2]

11.10 Many ethene monomers join together. Name the product and the process. [2]

11.11 Challenge. Ethene (C_2H_4) undergoes addition polymerisation. Name the polymer formed, and explain why ethane (C_2H_6) cannot be used to make a polymer this way. [3]