

18 Carboxylic acids – 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)		
ethanoic acid	乙酸	_____	_____	_____
carboxylic acid	羧酸	_____	_____	_____
weak acid	弱酸	_____	_____	_____
alcohol	醇	_____	_____	_____
aldehyde	醛	_____	_____	_____
reflux	回流	_____	_____	_____
nitrile	腈	_____	_____	_____
ester	酯	_____	_____	_____
salt	盐	_____	_____	_____
alkali	碱	_____	_____	_____
carbonate	碳酸盐	_____	_____	_____

Recall

At IGCSE you met **ethanoic acid** 乙酸 in vinegar — a **carboxylic acid** 羧酸. It has the **–COOH** (carboxyl) functional group and is a **weak acid** 弱酸.

- It reacts like any acid — with metals, alkalis and carbonates.
- It is made by oxidising a primary alcohol or an aldehyde.

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

New ideas

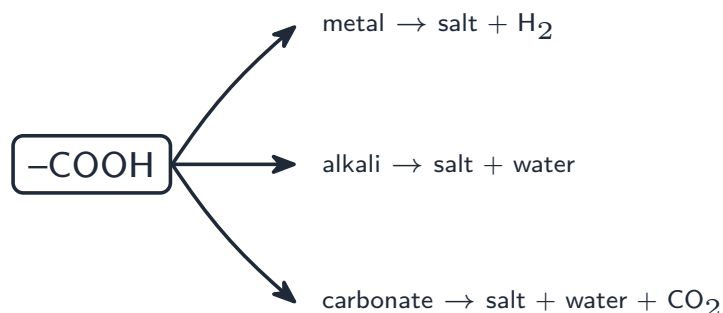
Read these first, then do the Practice.

■ 1 Making carboxylic acids

- **oxidise** a primary **alcohol** 醇 or an **aldehyde** 醛 (acidified $\text{K}_2\text{Cr}_2\text{O}_7$, with **reflux** 回流).
- **hydrolyse** a **nitrile** 腈 or an **ester** 酯, then acidify.

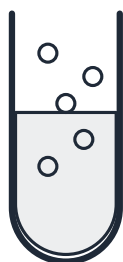
■ 2 Carboxylic acids behave as acids

Reacts with	Products
a reactive metal	a salt 盐 + hydrogen
an alkali 碱	a salt + water
a carbonate 碳酸盐	a salt + water + CO₂ (the fizz is a test)



■ 3 The carbonate test

Add a carboxylic acid to a carbonate: it **fizzes**, giving off carbon dioxide. This is a test for the –COOH group.



CO₂ fizz

acid + carbonate

Watch out: carboxylic acids are *weak* acids (only partly dissociated), yet they still react with metals, alkalis and carbonates. The fizz with a carbonate is a useful test for the –COOH group.

Practice

Try these in order.

18.1 Name the functional group of a carboxylic acid.

[1]

18.2 How is a carboxylic acid made from a primary alcohol?

[2]

18.3 Name the products when a carboxylic acid reacts with (a) a reactive metal, (b) an alkali.

[2]

18.4 Write the equation for ethanoic acid reacting with sodium carbonate.

[2]

18.5 Describe the test for a carboxylic acid using a carbonate.

[2]

18.6 Challenge. Ethanoic acid is a weak acid, yet it still fizzes with sodium carbonate. Explain how a weak acid can still react in this way.

[2]