

Exercise walk-through

Esters ■ 33.2

eXercise

You must be able to

- make an ester from an alcohol (or phenol) and an acyl chloride
- name an ester from its structure (and vice versa)
- write equations for ester formation

Method — Making and naming esters

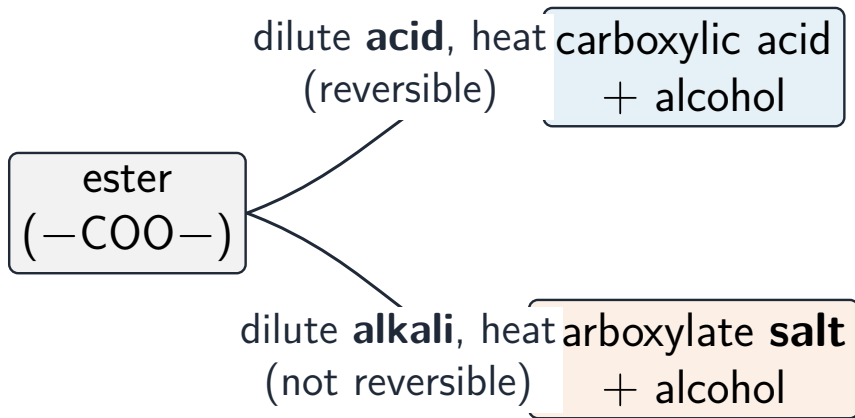
- **alcohol/phenol + acyl chloride $\rightarrow$ ester + HCl.**
- e.g. ethanol + ethanoyl chloride $\rightarrow$ ethyl ethanoate; phenol + benzoyl chloride $\rightarrow$ phenyl benzoate.
- **naming:** the alcohol part gives the first word (“ethyl”), the acid part gives the second (“...anoate”).

Method — Making and naming esters



An alcohol reacting with an acyl chloride to give the ester and hydrogen chloride

Method — Making and naming esters



Esters are hydrolysed back to acid and alcohol

Practice 2.1 ■ 1 mark

Name the ester $\text{CH}_3\text{COOCH}_2\text{CH}_3$.

Solution 2.1

Worked steps

ethyl ethanoate **B1**.

Practice 2.2 ■ 2 marks

Name the two organic starting materials (an acyl chloride + an alcohol) for ethyl ethanoate.

Solution 2.2

Method: Making and naming esters

Worked steps

ethanoyl chloride **M1**; ethanol **A1**.

Exam-style 3.1 ■ 1 mark

The ester HCOOCH_3 is named:

A methyl methanoate

B methyl ethanoate

C ethyl methanoate

D methanoyl methane

Solution 3.1

A methyl methanoate



B methyl ethanoate

C ethyl methanoate

D methanoyl methane

Worked steps

A. HCOO^- is methanoate; $-\text{CH}_3$ is methyl $\rightarrow$ methyl methanoate.

Exam-style 3.2 ■ 1 mark

Phenyl benzoate is made from benzoyl chloride and:

- A** benzene
- B** phenol
- C** benzoic acid
- D** phenylamine

Solution 3.2

Method: Making and naming esters

A benzene

B phenol



C benzoic acid

D phenylamine

Worked steps

B. Phenol + benzoyl chloride $\rightarrow$ phenyl benzoate + HCl.

Exam-style 3.3 ■ 2 marks

Methanol reacts with ethanoyl chloride.

- (a) Write the equation.
- (b) Name the ester formed.

Solution 3.3

Method: Making and naming esters

Worked steps

(a) $\text{CH}_3\text{COCl} + \text{CH}_3\text{OH} \rightarrow \text{CH}_3\text{COOCH}_3 + \text{HCl}$ **M1** **A1** *ester, balanced + HCl.*

(b) methyl ethanoate **B1**.

Exam-style 3.4 ■ 2 marks

Draw the structure of propyl methanoate and circle the **ester link**.

Solution 3.4

Worked steps

$\text{HCOOCH}_2\text{CH}_2\text{CH}_3$ drawn out **M1**; the $-\text{COO}-$ ester link circled **A1**.