

18 Esters – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

carboxylic acid

alcohol

ester

hydrolysis

condensation

Recall

From Part 1 you know a **carboxylic acid** has -COOH . When it reacts with an **alcohol**, it makes a sweet-smelling **ester** (the -COO- group).

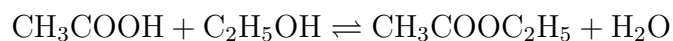
- Esters give fruits and perfumes their smell.
- They can be split apart again by water (**hydrolysis**).

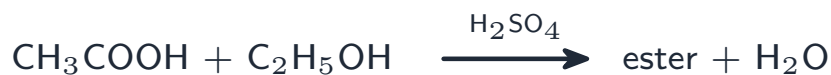
New ideas

Read these first, then do the Practice.

■ 1 Making an ester (esterification)

An **ester** forms in a **condensation** reaction between an alcohol and a carboxylic acid, with a concentrated H_2SO_4 catalyst. A **water** molecule is lost, and the reaction is reversible:



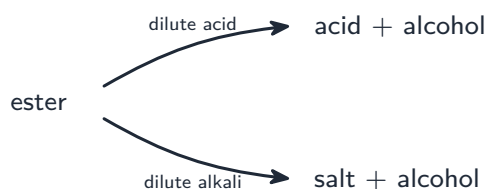


the $-\text{OH}$ and $-\text{H}$ leave as water

■ 2 Hydrolysis of an ester

Hydrolysis splits the ester apart. The conditions change the products:

- **dilute acid** + heat (reversible) $\rightarrow$ the **carboxylic acid** + the **alcohol**.
- **dilute alkali** + heat (not reversible) $\rightarrow$ the **carboxylate salt** + the **alcohol**.



Watch out: esterification is a *condensation* (water is lost) and is *reversible*. Acid hydrolysis simply reverses it (acid + alcohol), but *alkali* hydrolysis is *not* reversible – it gives the carboxylate salt plus the alcohol.

Practice

Try these in order.

18.1 Name the functional group of an ester. [1]

18.2 What two types of compound react to form an ester, and what catalyst is used? [2]

18.3 Esterification is a *condensation* reaction. What small molecule is lost? [1]

18.4 Name the products when an ester is hydrolysed by (a) dilute acid, (b) dilute alkali. [2]

18.5 Why might you smell an ester product as “sweet” or “fruity”? [1]

18.6 Challenge. Esterification is reversible and reaches an equilibrium. Suggest one way to increase the yield of the ester, and explain. [2]
