

21 Organic synthesis – 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)
alkene	烯烃	_____
halogenoalkane	卤代烷	_____
alcohol	醇	_____
aldehyde	醛	_____
ketone	酮	_____
carboxylic acid	羧酸	_____

Recall

This topic adds **no new reactions**. It asks you to **join up** the reactions you already know — to identify functional groups and to see how they interconvert.

- A molecule may have **more than one** functional group.
- Standard tests tell you which groups are present.

Nothing here is harder than IGCSE — it just connects the pieces.

New ideas

Read these first, then do the Practice.

■ 1 Identifying functional groups

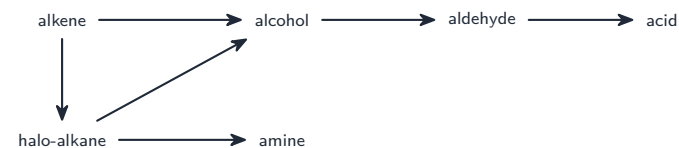
Each test gives a characteristic result that points to one group:

Test	Observation	Group
bromine water	decolourises	C=C (alkene 烯烃)
silver nitrate	precipitate	halogenoalkane 卤代烷
K ₂ Cr ₂ O ₇	orange → green	1°/2° alcohol 醇
2,4-DNPH	orange precipitate	aldehyde 醛 or ketone 酮
carbonate	fizzes (CO ₂)	carboxylic acid 羧酸

bromine water	decolourises	→	alkene
silver nitrate	precipitate	→	halogenoalkane
K ₂ Cr ₂ O ₇	orange → green	→	alcohol
2,4-DNPH	orange ppt	→	aldehyde/ketone
carbonate	fizzes	→	carboxylic acid

■ 2 A map of the reactions

Each reaction turns one functional group into another. Learn it as a **map** you can travel around: alkene ⇌ alcohol ⇌ aldehyde ⇌ carboxylic acid, with halogenoalkane and amine branches.



Watch out: match each test to its group — bromine water decolourises for an alkene, 2,4-DNPH gives an orange precipitate for *any* carbonyl, a carbonate fizzes for a carboxylic acid. (Tollens'/Fehling's then single out the *aldehyde*.)

Practice

Try these in order.

21.1 A compound decolourises bromine water. What functional group does it have? [1]

21.2 Which test, and result, identifies a carboxylic acid? [2]

21.3 A compound gives an orange precipitate with 2,4-DNPH but no silver mirror with Tollens'. What is it? [1]

21.4 Name the reagent that turns an alkene into an alcohol. [1]

21.5 Name the product when a halogenoalkane reacts with NaOH(aq). [1]

21.6 Challenge. A compound decolourises bromine water *and* fizzes with sodium carbonate. Name the two functional groups it must contain. [2]
