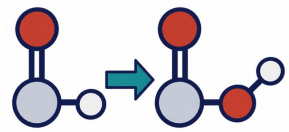
Carbonyl Compounds Summary Map

OCR A Level Chemistry A · 6.1.2 Carbonyl compounds

1 Oxidising aldehydes

6.1.2

- Aldehyde + [O] → **carboxylic acid**
- H on the C=O carbon is removed
- Ketones: a C–C bond would break
- So ketones **resist** oxidation



2 Telling them apart

6.1.2

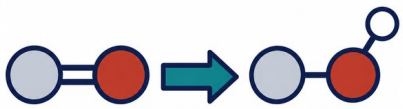
- $Cr_2O_7^{2-}$ / H^+: orange → **green**
- Tollens': **silver mirror**
- 1° and 2° alcohols: green, **no mirror**
- Ketones: no change

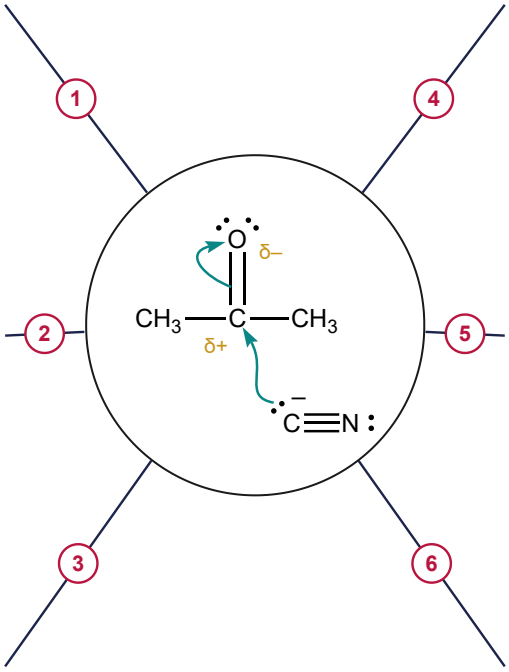


3 Reduction with $NaBH_4$

6.1.2

- **$NaBH_4$** in aqueous solution, [H]
- Aldehyde → **primary** alcohol
- Ketone → **secondary** alcohol
- C=C bonds left alone

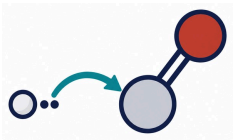




4 The H^- mechanism

6.1.2

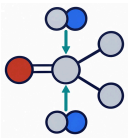
- **H^-** attacks the δ+ C
- π pair to O: alkoxide ion
- O^- takes H^+ from water
- **Nucleophilic addition**



5 NaCN(aq) and H^+(aq)

6.1.2

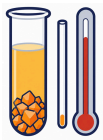
- $:CN^-$ attacks the **δ+ C**
- O^- takes H^+ from the acid
- Overall: HCN adds; chain +1 C
- Planar C=O: **racemic** product



6 2,4-DNP

6.1.2

- **Orange** precipitate: C=O present
- Aldehydes and ketones only
- Recrystallise; take the **melting point**
- Match the data: it **names** the compound



Which tests are positive?

✓ positive result; – no change

Compound	2,4-DNP	Tollens'	Dichromate(VI)
ethanal, CH_3CHO	✓ orange	✓ mirror	✓ green
propanal, CH_3CH_2CHO	✓ orange	✓ mirror	✓ green
propanone, CH_3COCH_3	✓ orange	–	–
butanone	✓ orange	–	–
propan-1-ol	–	–	✓ green
2-methylpropan-2-ol	–	–	–

Worked examples

Identify the unknown

- C_4H_8O, no mirror
- unbranched ketone
- **butanone**

Reduce it

- butanal + 2[H]
- $NaBH_4$(aq)
- **butan-1-ol**

Racemic?

- propanal + NaCN, H^+
- chiral C: H, OH, CN, C_2H_5
- **50 : 50**: inactive

Aldehydes lead to carboxylic acids and their derivatives in 6.1.3, and carbonyls are identified by NMR in 6.3.2.

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