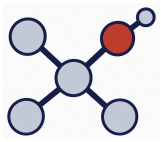
Alcohols Summary Map

AQA A-level Chemistry · 3.3.5 Alcohols

1 Names and classes

3.3.1.1 iv, 3.3.5.2 i

- **-ol** suffix; diols keep the e
- Count C on the C–OH carbon
- **1°**: 2 H, **2°**: 1 H, **3°**: 0 H
- $C_nH_{2n+1}OH$



2 Producing alcohols

3.3.5.1 i–iii, v, vii

- Steam + **H_3PO_4**, 300 °C, 60–70 atm
- H^+ adds to C=C; H_2O attacks C^+
- **Fermentation**: yeast, 35 °C, no air
- $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

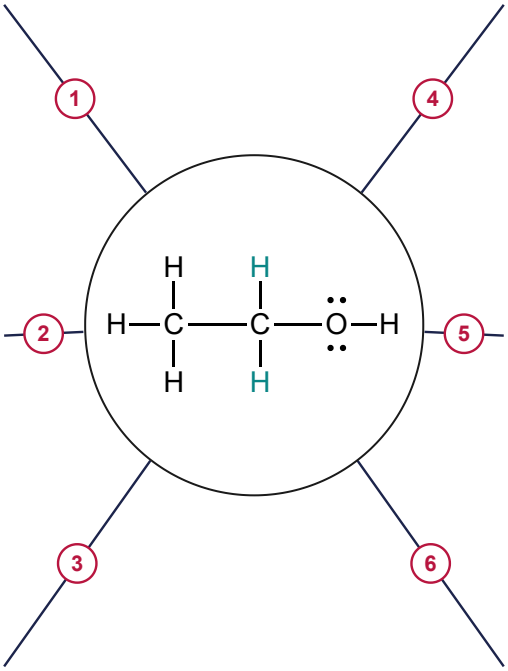


3 Biofuels

3.3.5.1 iv, vi, viii

- Made from renewable **biomass**
- $6CO_2$ in; 2 + 4 CO_2 out
- Not neutral: farming, transport
- Land for fuel, not food





4 To alkenes

3.3.5.3

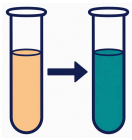
- **Conc. H_3PO_4**, heat
- O lone pair → H^+; water leaves
- C^+ loses H^+: C=C; check E/Z
- Polymers without crude oil



5 Oxidation

3.3.5.2

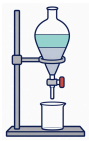
- Acidified $K_2Cr_2O_7$: orange → green
- 1° + distil: **aldehyde**
- 1° + reflux: **carboxylic acid**
- 2°: **ketone**; 3°: no reaction



6 Purifying a liquid

RP5

- **Reflux**: vapour returns
- **Separate**, wash with $NaHCO_3$
- **Dry**: anhydrous salt until clear
- **Distil**: sharp bp = pure



Which alcohol, which product?

acidified potassium dichromate(VI); tests on the product

Alcohol	Conditions	Product	Test on the product
propan-1-ol (1°)	distil as it forms	propanal	Fehling's: brick-red
propan-1-ol (1°)	excess, reflux	propanoic acid	$NaHCO_3$: fizzes
propan-2-ol (2°)	reflux	propanone	Fehling's: stays blue
2-methylpropan-2-ol (3°)	reflux	no reaction	stays orange

Worked examples

Name and class

- $CH_3CH(OH)CH_2CH_3$
- butan-2-ol
- C–OH carbon has 2 C: **secondary**

Fermentation

- 360 g glucose (Mr 180): 2.00 mol
- 2 ethanol per glucose: 4.00 mol
- **184 g** ethanol (Mr 46)

Percentage yield

- 5.00 g cyclohexanol (Mr 100)
- expect 4.10 g cyclohexene
- 3.28 g made: **80%**

Alcohols link halogenoalkanes (3.3.3) and alkenes (3.3.4) to aldehydes, ketones and acids (3.3.8, A-level); their products are identified in 3.3.6.

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