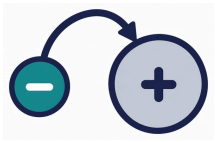
Halogenoalkanes Summary Map

Edexcel International A Level Chemistry · Unit 2 · Topic 10B Halogenoalkanes

1 Reactions and attackers

10.1–10.5

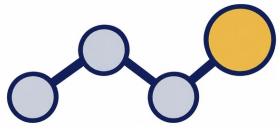
- Addition, elimination, **substitution**, hydrolysis
- **Nucleophile**: electron-pair donor
- Heterolytic fission: both electrons to X
- Polar C–X: δ+ C attracts nucleophiles



2 Names and classes

10.6–10.7

- Halogen as a **prefix**: 2-bromobutane
- Lowest numbers; alphabetical prefixes
- Carbons on C–X: **1° 2° 3°**
- Skeletal: halogen always written

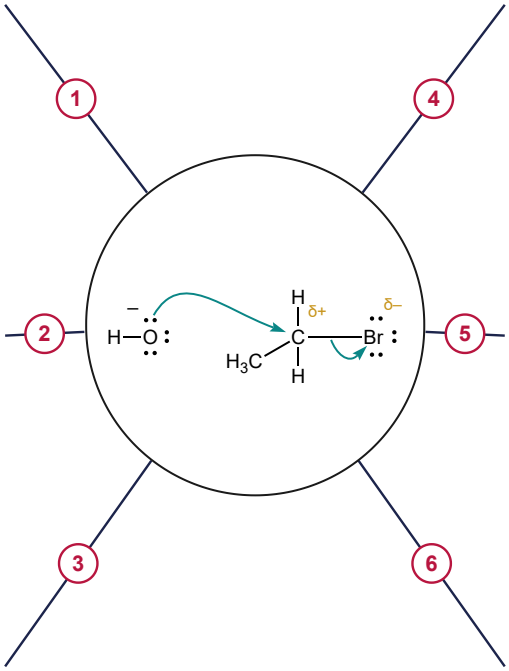


3 Hydroxide and water

10.8 i, iii, 10.9 i

- **KOH(aq), warm**: alcohol
- Lone pair on O → δ+ C; C–X pair → X
- Water: weaker nucleophile, no charge
- $AgNO_3$ in ethanol: AgX precipitate





4 Ammonia and cyanide

10.8 iv–v, 10.9 ii

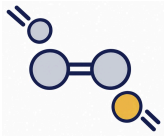
- **Excess NH_3**, ethanol, sealed tube: amine
- Second NH_3 removes H^+
- **KCN in ethanol**, reflux: nitrile
- New C–C: chain one longer



5 Elimination

10.8 ii

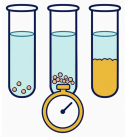
- **KOH in ethanol, hot**: alkene
- OH^- acts as a **base**: takes H^+
- H and X from neighbouring carbons
- Several alkenes: check E/Z



6 Rates of hydrolysis

10.10–10.13

- Time to the precipitate: rate ∝ 1/t
- C–I weakest: **iodo fastest**
- Bond enthalpy, not polarity
- **Tertiary > secondary > primary**



One halogenoalkane, five products

bromoethane, CH_3CH_2Br; KOH aqueous for substitution, ethanolic for elimination

Reagent	Conditions	Product	OH^-, NH_3 or CN^- acts as
KOH(aq)	warm, reflux	ethanol	nucleophile
H_2O ($AgNO_3$)	ethanol, warm	ethanol + AgBr	nucleophile (water)
NH_3 (excess)	ethanol, sealed tube, heat	ethylamine	nucleophile, then base
KCN	ethanol, reflux	propanenitrile	nucleophile
KOH in ethanol	hot	ethene	base

Worked examples

Name and class

- $(CH_3)_3CBr$
- 2-bromo-2-methylpropane
- C–Br carbon has 3 C: **tertiary**

Three alkenes

- 2-bromobutane, hot ethanolic KOH
- but-1-ene
- **E** and **Z** but-2-ene

Which is faster?

- 1-iodo- or 1-chloropropane
- C–I 228, C–Cl 346 kJ mol^{-1}
- **iodo**: weaker bond

Halogenoalkanes link alkanes and alkenes to alcohols (Topic 10C), amines and nitriles; SN1 and SN2 follow in Unit 4.

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