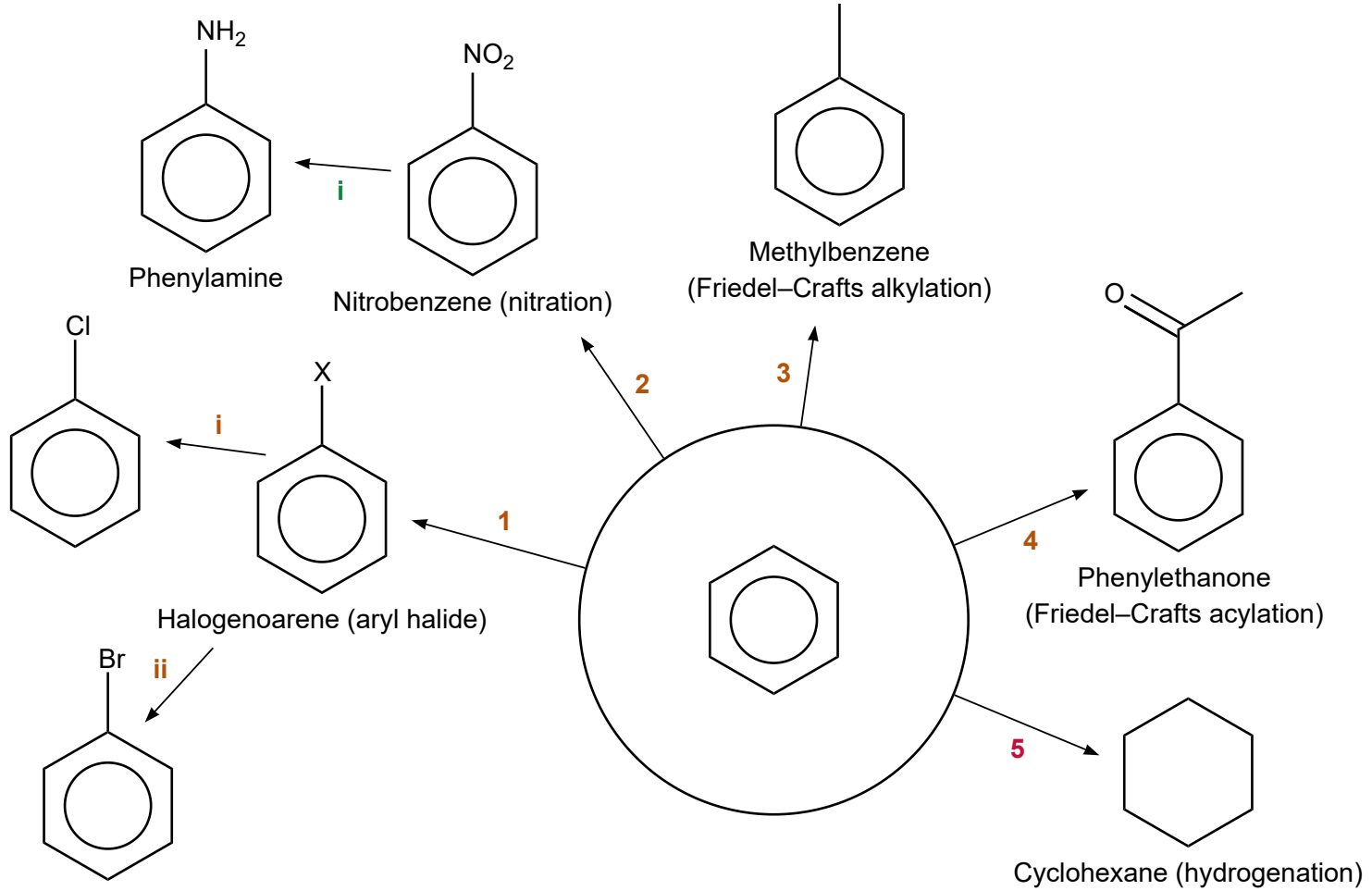
Benzene Map

Cambridge International AS & A Level Chemistry · Topic 30 Hydrocarbons



1 substitution (electrophilic): Cl_2 or Br_2 with a catalyst, room temperature, dark
i Cl_2, $AlCl_3$ → chlorobenzene
ii Br_2, $AlBr_3$ → bromobenzene

2 substitution (electrophilic): conc. HNO_3 and conc. H_2SO_4, 25–60 °C
i reduction: hot Sn and conc. HCl, then NaOH(aq), heat under reflux

3 substitution (electrophilic): CH_3Cl, $AlCl_3$, heat

4 substitution (electrophilic): CH_3COCl, $AlCl_3$, heat

5 addition: H_2, Pt or Ni catalyst, heat

Substitution keeps the delocalised ring (aromatic stabilisation), so it is favoured over addition.
Directing effects: –OH, $–NH_2$, –R direct to 2-, 4-; $–NO_2$, –COOH, –COR direct to 3-.

substitution addition reduction

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