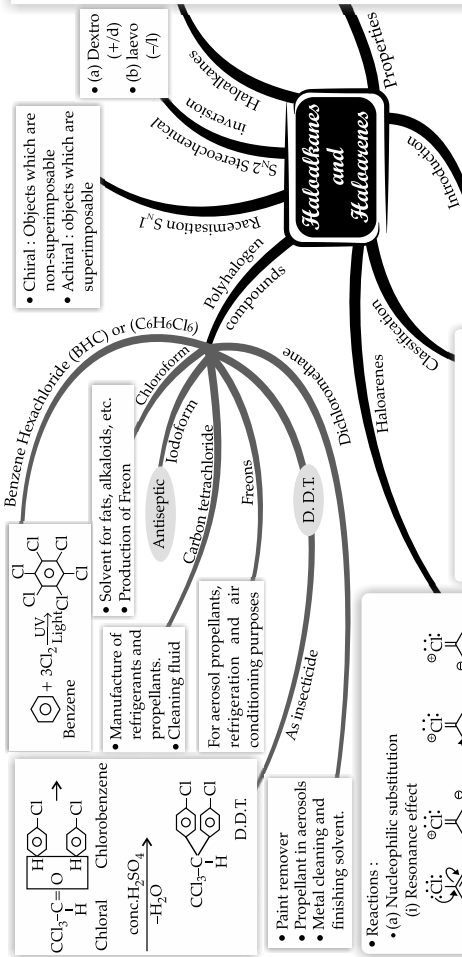




Preparation

- From alcohol: $\text{R-OH} + \text{HX} \xrightarrow{\text{ZnCl}_2} \text{R-X} + \text{H}_2\text{O}$
- From hydrocarbons: $\text{R-X} + \text{NaI} \rightarrow \text{R-I} + \text{NaX}$
- From alkenes: $\text{H}_2\text{C}=\text{CH}_2 + \text{Br}_2 \xrightarrow{\text{CCl}_4} \text{BrCH}_2\text{CH}_2\text{Br}$
- From alkynes: $\text{H-C}\equiv\text{C-H} + \text{X}_2 \rightarrow \text{X-C}\equiv\text{C-X}$

Properties

- Physical**: Colourless, volatile, sweet smell.
- Chemical**: Lower members are gases at room temperature while higher are solids. B.P: $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$
- M.P**: *Para* isomers have high m.p. than *ortho* and *meta* isomers.
- Density**: Increases with increase in number of C-X atoms and atomic masses of the X atoms.
- Solubility**: Very slightly soluble in water.

Reactions

- (a) Nucleophilic substitution**
 - Hydrolysis**: $\text{R-X} + \text{OH}^- \rightarrow \text{R-OH} + \text{X}^-$
 - Alkylation**: $\text{R-X} + \text{R}'\text{MgBr} \rightarrow \text{R-R}' + \text{MgBrX}$
- (b) Electrophilic substitution**
 - Friedel-Crafts reaction**: $\text{C}_6\text{H}_6 + \text{X}_2 \xrightarrow{\text{AlX}_3} \text{C}_6\text{H}_5\text{X} + \text{HX}$
 - Wurtz-Fittig reaction**: $2\text{C}_6\text{H}_5\text{X} + 2\text{Na} \xrightarrow{\text{Ether}} \text{C}_{12}\text{H}_{10} + 2\text{NaX}$

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