

Chlorofluorocarbons

CFCs are halogenoalkanes with only carbon, chlorine and fluorine atoms

Legislation to ban use of CFCs

Alternatives to CFCs include HFCs and hydrocarbons

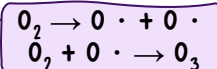
3.3 HALOGENOALKANES

Depletion of Ozone

Ozone, O₃, prevents a lot of UV radiation from the sun from reaching Earth

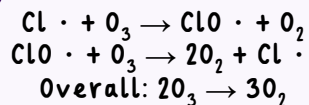
UV radiation causes sunburn and skin cancer

Ozone formed from oxygen free radicals



Chlorine free radicals are formed in the atmosphere

This happens when UV light breaks C-Cl bonds in CFCs



Chlorine atoms catalyse the decomposition of ozone

Leads to holes in the ozone layer

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3.3 HALOGENOALKANES

Nucleophilic Substitution Reactions

Reagent: ethanolic potassium cyanide

Formation of nitriles

A nucleophile replaces a halogen atom

Nucleophiles are electron-pair donors

The carbon-halogen bond is polar so the δ^+ carbon attracts nucleophiles

Carbon-halogen bond strength determines reactivity

C-F bond is the strongest so has the highest bond enthalpy

C-I bond has the lowest bond enthalpy

Rate of reaction increases from fluoroalkanes to iodoalkanes

Elimination Reactions

Formation of an alkene from a halogenoalkane

Elimination – the hydroxide ions must be dissolved in ethanol

Anhydrous conditions

Hydroxide ions act as a base

E.g. potassium hydroxide

Accept a proton from the carbon atom

Reflux

Formation of amines

The amine group has a lone pair of electrons

Acts as a nucleophile

Reagent: excess ethanolic ammonia

Hydrolysis

Reagent: warm aqueous potassium or sodium hydroxide

Formation of alcohols

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