

(B) Properties of ethers:

Physical properties

(i) Ethers have a net dipole moment.

(ii) The boiling point of ethers is comparable to alkanes.

(iii) Ether molecules are miscible in water.

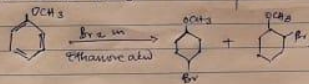
Chemical properties

(i) Ethers are very unreactive in nature. When an excess hydrogen halide is added to the ether, cleavage of the C-O bond takes place leading to the formation of alkyl halides. The order of reactivity is given as $\text{HI} > \text{HBr} > \text{HCl}$



(ii) Halogenation of ethers:

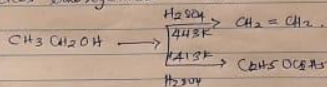
Aromatic ethers ~~can~~ undergo halogenation for example bromination upon the addition of bromine in the presence or absence of a catalyst.



(B) 2 methods of preparing ethers:

(i) Preparation of ethers by Dehydration of Alcohols:

In the presence of protic acids (sulphuric acid), alcohols undergo dehydration to produce alkenes and ethers under different conditions. For example in the presence of sulphuric acid, the dehydration of ethanol at 433K yields ethene whereas yields ethoxyethane at 413K.



(ii) Preparation of Ethers by Williamson Synthesis:

In this method, an alkyl halide is reacted with sodium alkoxide/alkoxide which leads to the formation of ether. The reaction generally follows the $\text{S}_{\text{N}}2$ mechanism for primary alcohol.



This produces higher yields in the case of primary alkyl halides. In this case, secondary alkyl halides, elimination competes with substitution but the formation of elimination products only in the case of tertiary alkyl halides.

(iii) Ethylene oxide is used to make adhesives.

It is used to make sterilization agents for medical equipments.

~~It is used to make~~

Ethylene oxide is used to make fungicides and pesticides.