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Course: CHM 102.
Mechatronics Engineering.

1 CH_3OCH_3 - Methoxymethane

2 $CH_3CH_2OCH_2CH_3$ - Ethoxyethane

3 $(CH_3CH_2CH_2CH_2)_2O$ = ~~Butmethane~~ Butoxybutane

4 $CH_3CH_2OCH_3$ - ~~Propoxyethan~~e methoxyethane

5 $CH_3CH_2CH_2OCH_2CH_3$ - ~~Pentoxyethane~~ Ethoxypropane

2 Discuss the properties of ethers

Physical Properties

a) An ether molecule has a net dipole moment due to the polarity of C-O bonds

b) Ether molecules are miscible in water

c) The boiling point is comparable to the alkanes but much lower than that of alcohols

Chemical Properties

a) Ethers are very unreactive in nature.

b) Electrophilic substitution - The alkoxy group in the ether activates the aromatic ring at ortho and para positions for electrophilic substitution.

6 Halogenation of ethers

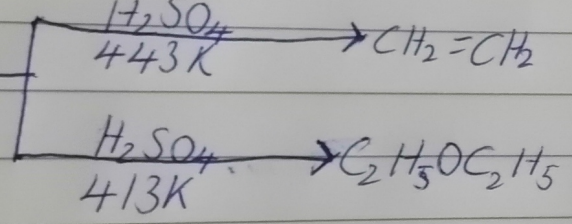
Aromatic ethers undergo halogenation, for example bromination.

3 DISCUSS explicitly two methods of preparing ethers and show equations of reaction

a 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.

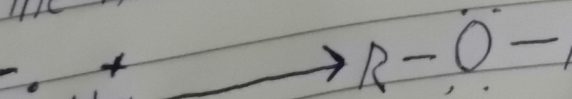
The preparation of ethers by dehydration of an alcohol is a nucleophilic substitution reaction



The alcohol in the reaction plays two roles: one acts as a nucleophile while the other molecule acts as a substrate either SN1 or SN2 mechanism.

B) Preparations of Ethers by Williamson synthesis

It is an important method for the preparation of symmetrical and assymetrical ethers in laboratories. In this method, an alkyl halide is reacted with sodium alkoxide which leads to the formation of ether. The reaction generally follows SN2 mechanism for primary alcohol



4) State three uses of ethylene oxide

a) For the production of detergents, antifreeze, fumigants and Pesticides.

b Production of several industrial chemicals

c It can be used as a sterilant for medical equipment and supplies.