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Chemistry Assignment

MBA

Assignment on Ethers

1) Give the IUPAC name of the following organic compound

i) CH_3OCH_3 - Dimethyl ether

ii) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - methoxyethane (Ethoxy ethane)

iii) $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ - Butoxyethane

iv) $\text{CH}_3\text{CH}_2\text{OCH}_3$ - methoxyethane

v) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxy propane

2) Discuss the properties of ethers

General properties

Physical state: Ethers are colourless, neutral liquids with pleasant odour at room temperature

Solubility - Ethers are less soluble in water than are the corresponding alcohols.

Density - Most of the simple ethers are less dense than water although the density increases with increasing relative molecular mass

Boiling point - Low molecular mass ethers are less dense than water although the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms the reverse is true.

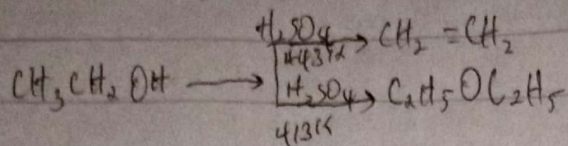
Reactivity - Ethers are inert at moderate temperature

3) Discuss explicitly two methods of preparing ethers and show equations of reactions

i) Partial dehydration of alcohols:

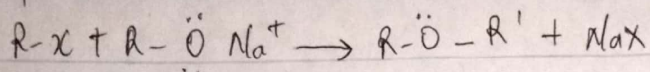
Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is excess and conc. tetraoxo sulphate (VI) acid is heated at a carefully maintained temperature of 140°C . This process is known as controlled etherification for example: in the presence of sulphuric acid, dehydration of ethanol at 140°C

Yields ethene, whereas it yields ethoxyethane at 413 K. This is an ideal method of preparation through primary alcohols.



ii) Preparation of ethers by Williamson synthesis

Williamson synthesis is an important method for the preparation of symmetrical and asymmetrical ethers, in laboratories. In this method, an alkyl halide is reacted with sodium alkoxides which leads to the formation of ether. The reaction generally follows the $\text{S}_\text{N}2$ mechanism for primary alcohol.



As we know alkoxides are strong bases and they can react with alkyl halides leading to the elimination reactions

4) State 3 uses of Ethylene oxide

- i) It is used to make antifreeze
- ii) It is used as a sterilization agents for medical equipments
- iii) It is used as a fumigant and particles.

2) i) Chemical properties of Ethers

i) Cleavage of C-O bond: Ethers are generally very unreactive in nature. When an excess of hydrogen halide is added to the ~~formation of alkyl halides~~ ether cleavage of C-O bond takes place leading to the formation of alkyl halides.

The order of reactivity is given as $\text{HI} \rightarrow \text{HBr} \rightarrow \text{HCl}$

ii) Electrophilic Substitution: The alkoxy group in ether activates the aromatic ring at ortho and para positions for electrophilic substitution reactions are halogenation, Friedel Crafts reaction e.t.c.

iii) Halogenation of Ethers: Aromatic ethers undergo halogenation for example bromination, upon the addition halogen in the presence or absence of catalysts.