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Topic - CHM 103 Assignment
Dept - AGRICULTURAL SCIENCE

1) Give the IUPAC names of the following organic compound

a) CH_3OCH_3
~~Methyl~~ Methoxymethane

b) $CH_3CH_2OCH_2CH_3$
~~Ethoxy~~ Ethoxyethane

c) ~~CO~~ $(CH_3CH_2CH_2OCH_2CH_2)_2O$

2) Discuss the properties of Ethers
General properties
i) Physical states
At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

2) Solubility
Ethers are less soluble in water than are the corresponding alcohols. Lower molecular weight ethers such as methoxymethane and methoxyethane are fairly soluble in water since the molecules are able to form hydrogen bonds with the water molecules but as the hydrocarbon content of the molecules increases there is a rapid decline in solubility. They are miscible with most organic solvents.

3) Density
~~Their boiling~~ Most of the simple ethers are less dense than water, although the density increases with increasing relative molecular mass and some of the aromatic ethers are in fact

Discuss the above

4) Boiling point

Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than two carbon atoms the reverse is true. The boiling point of ethers tend to approximate that of hydrocarbons of same relative molecular mass than which it can be concluded that the molecules are not associated in the liquid phase as there are no suitably available hydrogen for association through hydrogen bonding.

5) Reactivity: Ethers are inert at moderate temperatures. Their inertness at moderate temperatures leads to their wide use as reaction media. Simple ethers are not found commonly in nature but the ether linkage is present in such natural products as sugars, starches and cellulose.

3) Discuss briefly the methods of preparing ethers and show equations of reactions.

Methods of preparation of ethers

a) Normal dehydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated sulphuric acid is heated at a carefully maintained temperature of 140°C. This process is known as Continuous etherification. If excess alcohol is not used, the temperature is raised to 170-180°C and then dehydration to yield alkene occurs.

$$2ROH \xrightarrow{Conc.\ H_2SO_4,\ 140^\circ C} R-O-R + H_2O$$

Example

$$2CH_3CH_2OH \xrightarrow{Conc.\ H_2SO_4,\ 140^\circ C} CH_3CH_2-O-CH_2CH_3 + H_2O$$

b) From Halogenoalkanes and dry Silver (I) oxide

$$2RX + Ag_2O \xrightarrow{\text{ether}} R-O-R + 2AgX$$

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