19/MHS01/422

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CHM 102 (ASSIGNMENT ON ETHER)

1. CH_3OCH_3
IUPAC Name - Methoxymethane
$CH_3CH_2OCH_2CH_3$
IUPAC Name - Ethoxyethane
$(CH_3CH_2CH_2CH_2)_2O$
IUPAC Name - 2-Methanidyl-Propane
$CH_3CH_2OCH_3$
IUPAC Name - Methoxyethane
$CH_3CH_2CH_2OCH_2CH_3$
IUPAC Name - Ethoxypropane

2 i. Polarity: Since the electronegativity of oxygen is greater than that of carbon, ethers are polar in nature Moreover, the two C-O bonds in ether are inclined to each other at an angle of 110°, so the dipoles do not cancel each other, resulting in a net dipole moment.

ii. Boiling point: The boiling point of ethers is lower than that of isomeric alcohols because ethers do not form H-bonds within themselves.

iii. Solubility: Lower ethers (up to three carbon atoms) are soluble in water because they form hydrogen bonds with water molecules. Ethers are fairly soluble in organic solvents such as alcohols, benzene, acetone.

iv. Density: Ethers are lighter than water.

3. i. Preparation by Williamson synthesis
In this method, an alkyl halide is reacted with sodium alkoxide which leads to the formation of ethers. The reaction generally follows the S_N2 mechanism for primary alcohol.

equation.

$$R-X + R'-\ddot{O}^{-}\,Na^{+} \longrightarrow R-\ddot{O}-R' + NaX$$

ii. Preparation by dehydration of Alcohols
This method is a nucleophilic substitution reaction. The alcohol involved in reaction plays two roles: one alcohol involved plays two roles: one alcohol molecule acts as a substrate while the other acts as a nucleophile. It can follow either an S_N1 or S_N2 mechanism. The choice of the mechanism depends on whether the protonated alcohol loses water before or simultaneously upon the attack of a second alcohol molecule.

$$CH_3CH_2OH \xrightarrow[443K]{H_2SO_4} CH_2=CH_2$$

$$CH_3CH_2OH \xrightarrow[413K]{H_2SO_4} C_2H_5OC_2H_5$$

4. i. It is used to make antifreeze, adhesives, detergents, polyester, etc
ii. It is used as a fumigant on certain agricultural products and as a sterilant for medical equipments and supplies.
iii. It is produced on large volumes and used in the production of several industrial chemicals.