NAME - NDU-UGHAMADU ADAEZE CHIDINMA
MATRIC NO - 19/MHS01/257
DEPARTMENT - MEDICINE AND SURGERY

1. i. CH_3OCH_3 - Methoxymethane

ii $CH_3CH_2OCH_2CH_3$ - Ethoxyethane

iii $(CH_3CH_2CH_2CH_2)_2O$ - Butoxybutane

iv $CH_3CH_2OCH_3$ - Methoxyethane

v $CH_3CH_2CH_2OCH_2CH_3$ - Ethoxypropane

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2. GENERAL PROPERTIES OF ETHERS

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.

ii 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 molecule 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.

iii DENSITY

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 denser than water.

iv BOILING POINT

Low molecular mass of ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true. The boiling point of ethers tend to approximate those of hydrocarbons of same relative molecular mass from 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 bonds.

v. REACTIVITY

Ethers are inert at moderate temperature. Their inertness at moderate temperature leads to their wide use as a reaction media

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3 METHODS OF PREPARATION OF ETHERS

i. PARTIAL DEHYDRATION OF ALCOHOLS

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

Example:

$$2CH_3CH_2OH \xrightarrow[140^\circ C]{\text{conc } H_2SO_4} CH_3CH_2OCH_2CH_3 + H_2O$$

Ethanol — Ethoxyethane — Water

ii FROM HALOALKANES AND DRY SILVER(I) OXIDE

Simple ethers are manufactured from reaction between haloalkanes and dry silver(I) oxide. The Haloalkane and the dry silver (i) oxide are heated to form a simple ether and a silver halide.

Example:

$$2CH_3Cl + Ag_2O \xrightarrow{\text{warm}} CH_3OCH_3 + 2AgCl$$

Chloromethane — Silver(i) oxide — Methoxymethane — Silver Chloride

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4. USES OF ETHYLENE OXIDE

i. It is used as an intermediate in the hydrolytic manufacture of ethylene glycol.

ii. It is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles.

iii Ethylene oxide is used as a gaseous sterilizing agent.

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