AJAYI BUKOLA PRECIOUS
NURSING
19/MHS02/012
CHM 102 ASSIGNMENT

1.) Give the IUPAC names of the following Organic Compounds
$CH_3OCH_3$, $CH_3CH_2OCH_3$, $CH_3CH_2OCH_2CH_3$, $(CH_3CH_2CH_2CH_2)_2O$, $CH_3CH_2OCH_3$
$CH_3CH_2CH_2OCH_2CH_3$

Answer

$CH_3OCH_3$ - Methoxymethane
$CH_3CH_2OCH_2CH_3$ - Ethoxyethane
$(CH_3CH_2CH_2CH_2)_2O$ - Butoxymethane
$CH_3CH_2OCH_3$ - Methoxyethane
$CH_3CH_2CH_2OCH_2CH_3$ - Ethoxy propane

2.) Discuss the Properties of ethers.

Answer

General Properties of ethers

- Physical State: At room temperature ethers are colourless neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.
- Solubility: Ethers are less soluble in water than 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.
- 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 infact denser than water.
- Boiling Point: Low molecular mass ethers have a lower boiling points than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true. The boiling point of ether 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.

- Reactivity: Ethers are inert as 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 ethers linkage is present in such natural products as sugars, starches and cellulose.

3) Discuss explicitly two methods of Preparing ethers and show equation of reaction

Answer

i) Partial dehydration of Alcohols

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

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

E.g

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

ii) from Haloalkane and dry silver(I) oxide

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

$$2CH_3CH_2CH_2Cl + Ag_2O \xrightarrow{\text{warm}} CH_3CH_2CH_2OCH_2CH_2CH_3 + 2AgCl$$

Propoxypropane

4) State 3 uses of ethylene Oxide

Answer

i) Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol

ii) Ethylene oxide 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.