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PHARMACOLOGY
MEDICINE & HEALTH SCIENCES
CHEM 102 ASSIGNMENT
19/MHS07/002

2 Discuss the properties of ethers.

a Physical states

At room temperature, ethers are colourless and neutral liquids with pleasant odours.

b Solubility

They are less soluble in water than are the corresponding alcohols. Lower molecular weight ethers 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 rapid decline in solubility.

c Density

Some of the simple ethers are less than water and some of the aromatic ethers are in fact denser than water.

d Boiling Point

Low molecular mass 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 suitable ^{available} hydrogen for association through hydrogen bonds.

e Reactivity

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

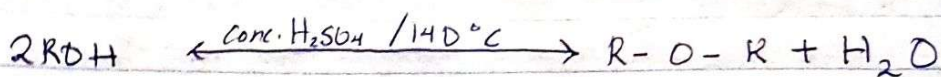
3 Discuss explicitly two methods of preparing ethers and show equations of reaction.

a Partial dehydration of alcohols

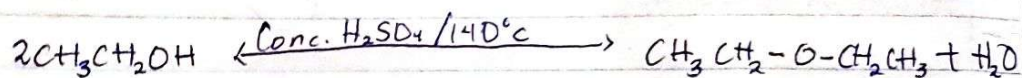
b From haloalkanes and dry silver (I) oxide.

a Partial dehydration of alcohols.

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated tetraoxosulphuric 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 as high as $170^{\circ}\text{--}180^{\circ}\text{C}$, further dehydration to yield alkene occurs.

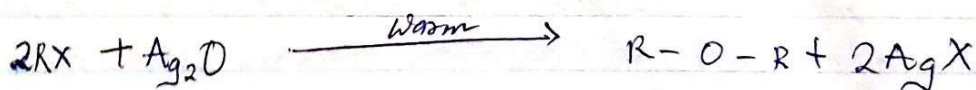


Example:

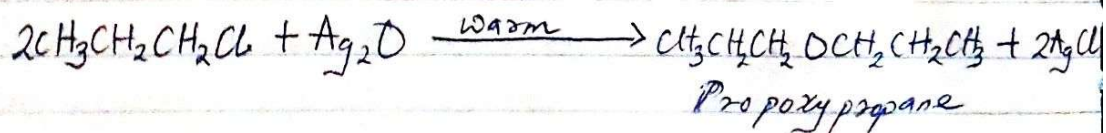


b From Haloalkanes and dry silver (I) oxide

Ethers can be manufactured from haloalkanes and dry silver (I) oxide at a warm temperature.



Example:



4 State three uses of ethylene oxide.

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

b Ethylene oxide is also used in the preparation of non-ionic emulsifying agents, plastic, plasticizers and several synthetic textiles.

c Ethylene oxide is used as a gaseous sterilizing agent.

1 Give the IUPAC names of the following organic compounds

a CH_3OCH_3 - Methoxymethane

b $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxyethane

c $\{\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\}_2\text{O}$ - Butoxymethane

d $\text{CH}_3\text{CH}_2\text{OCH}_3$ - Methoxyethane

e $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxypropane