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19/MHS01/426
Medicine and surgery
Chm102
Assignment on ethers

ASSIGNMENT ON ETHER

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MEDICINE & SURGERY I

GENERAL CHEMISTRY II

CHM 102

1. Give the IUPAC names of the following organic compounds

CH_3OCH_3 : Methoxyethane (Dimethyl ether)

$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$: Ethoxyethane (Diethyl ether)

$(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$: Butoxyethane (Dibutyl ether)

$\text{CH}_3\text{CH}_2\text{OCH}_3$: Methoxyethane

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$: Ethoxypropane.

2. Discuss the properties of ethers.

•1. PHYSICAL PROPERTIES

At room temperature, ethers are colorless, neutral liquids with pleasant odors. The lower aliphatic ethers are highly flammable gases or volatile liquids.

2. 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 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

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.

4. BOILING POINT

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

5. REACTIVITY

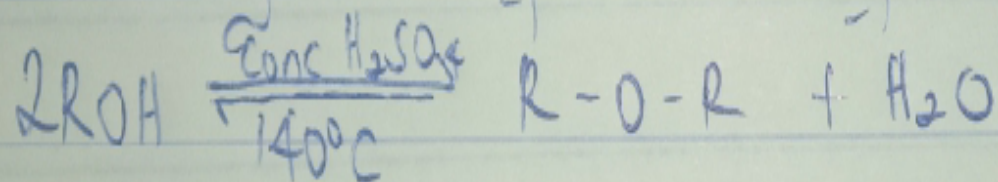
Ethers are inert at moderate temperatures. Their inertness at moderate temperatures leads to their wide use as reaction media.

3. Discuss explicitly two methods of preparing ethers

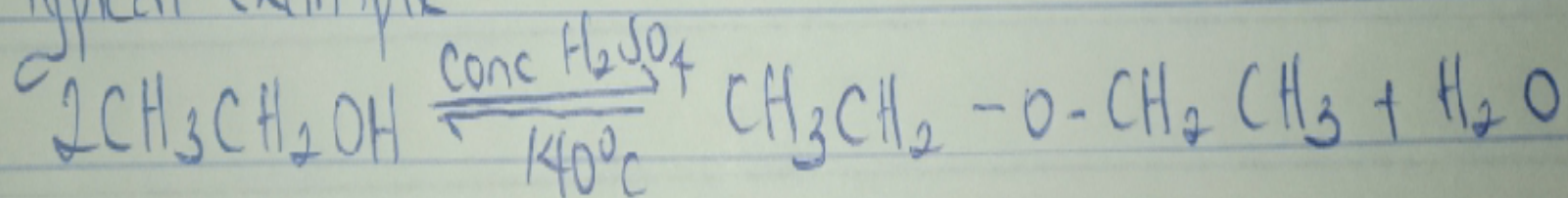
- 1. PARTIAL DEHYDRATION OF ALCOHOLS

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentration tetraoxosulphate (VI) acid (H_2SO_4) is heated at a carefully maintained temperature of 140°C . This process is known as continuous etherification. If excess alcohol is not used, and the temperature is as high as $170\text{-}180^\circ\text{C}$, further dehydration to yield alkene occurs .

i) partial dehydration of alcohols equation



A typical example



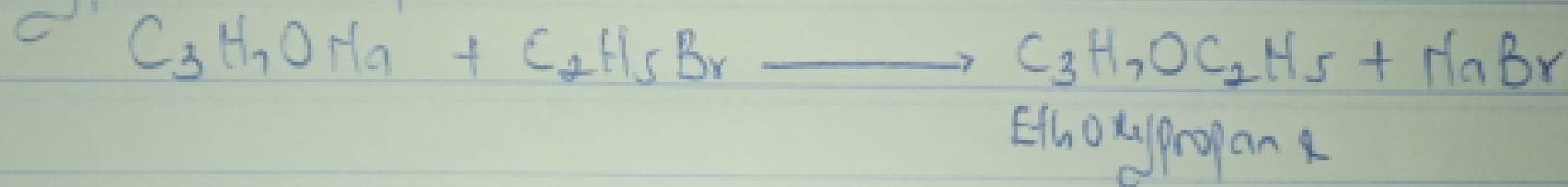
- 2. WILLIAMSON'S SYNTHESIS

Mixed or simple ethers of definite structure may be synthesized by Williamson's synthesis . The process involves the displacement of a halogen from an haloalkane by an alkoxide(alkylate) or phenoxide (phenate) ion. Methoxyaromatics are more efficiently prepared from the dimethyl sulphate and appropriate phenol.

ii) Williamson's synthesis



A typical example



4. Three uses of ethylene oxide

- 1. Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol
- 2. Ethylene oxide is used in the preparation of non ionic emulsifying agent, plastics , plasticizers and several synthetic textiles.
- 3. Ethylene oxide is used as a gaseous sterilizing agent .