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COURSE CODE: CHM 102

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A] The IUPAC names are;

1. CH_3OCH_3 - Methoxymethane
2. $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxyethane / Diethyl ether
3. $[\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2]_2\text{O}$ - Dibutyl ether
4. $\text{CH}_3\text{CH}_2\text{OCH}_3$ - Methoxyethane
5. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxypropane / Ethylpropyl

B] The properties of ethers are;

1. Physical states: Ethers are colorless, neutral liquids that have pleasant odours.

2. Solubility: Ethers are less soluble in water than the alcohols.

Methoxymethane and Methoxyethane which are 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 molecule increases, there is a rapid decline in solubility. They are miscible with most organic solvents.

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

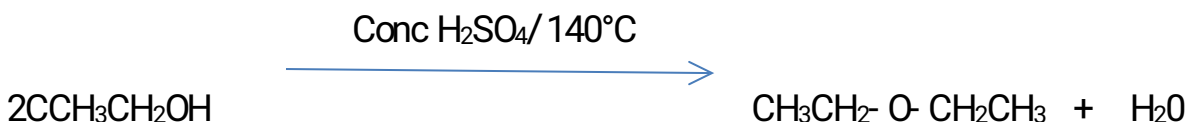
4. Boiling points: Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true. The boiling point of ethers tend to approximate those of hydrocarbons of same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase as there are no suitably available hydrogen for association through

hydrogen bonds.

5. Density: Simple ethers are less dense than water. Density increases with increasing relative molecular mass and some of the aromatic ethers are in fact denser than water.

C] The methods of preparing Ethers are;

1. Partial dehydration of alcohols; Simple ethers are manufactured from alcohol in excess and concentrated tetraoxosulphate [VI] acid is heated at a temperature of 140°C, this process is known as continuous etherification. If excess alcohol is not used, the temperature is as high 170°C- 180°C, further dehydration to yield alkene occurs.



2. Controlled catalytic hydration of olefins



D] The three uses of ethylene oxide are;

1. Ethylene oxide is used as a gaseous sterilizing agent.

2. Ethylene oxide is used in the preparation nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles.

3. Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol.

