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MATRIC NO: 19/ENG07005

COURSE CODE: CHM 102 (Ethanol)

1, CH_3OCH_3 — Methoxymethane

$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ — Ethoxyethane

$(\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2)_n\text{O}$ — Butoxymethane

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

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ — Ethoxypropane

② General Properties

Physical States

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 are 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.

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.

Boiling Point

Low molecular mass ethers have a lower boiling point than the correspond

alcohol but these ethers containing alkyl radicals larger than four carbon atoms, the reverse is true.

Reactivity

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

③ Manufacture And Preparation of Ethers

Partial dehydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated tetraoxo sulphate (VI) 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 $170-180^{\circ}\text{C}$; further dehydration to yield alkene occurs

$$2\text{ROH} \xrightarrow[\text{H}_2\text{SO}_4]{140^{\circ}\text{C}} \text{R-O-R} + \text{H}_2\text{O}$$

④ Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol

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

Ethylene oxide is used as a gaseous sterilizing agent.