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COMPUTER ENGINEERING.

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GENERAL CHEMISTRY II

CHM 102

1. IUPAC Names of the following organic compounds

CH_3OCH_3 — methoxymethane

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

$(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ — 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. Properties of ethers -

- Physical states;

At room temperatures ethers are colourless, neutral liquids and have a pleasant odour. Lower aliphatic ethers are highly flammable gases or volatile liquids

- solubility;

Ethers are less soluble in water than corresponding

alcohols, lower molecular weight ethers such as methoxymethane or methoxyethane are fairly soluble in water because the molecule are able to form hydrogen bonds with water molecules but as hydrogen carbons increases solubility decreases rapidly. They are miscible with most organic solvents.

- Density.

most of the simple ethers are less dense than water, although density increases with increasing relative molecular mass and some of the aromatic ethers are in fact denser than water.

- Boiling Point -

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

- Reactivity

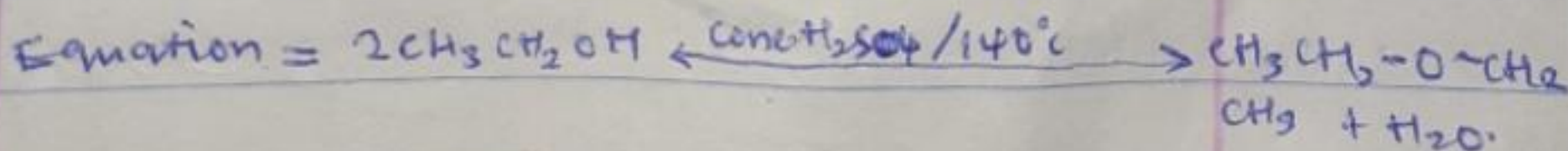
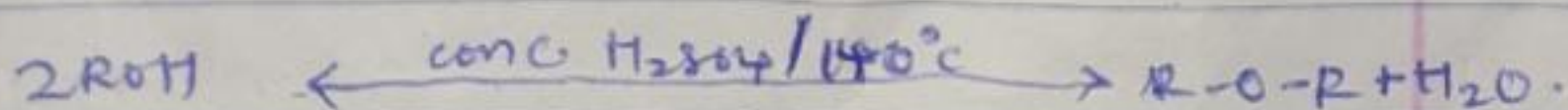
Ethers are inert at moderate temperatures. Their inertness at moderate temperatures leads to their wide use as reaction media,

Simple ethers are not found commonly in nature but the ether linkage is present in such natural products as sugars, starches and cellulose.

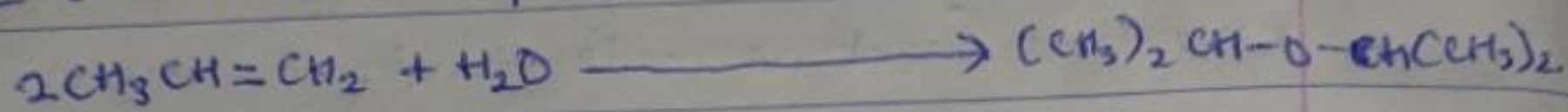
3. Preparation of ethers

I. Partial dehydration of alcohol.

Ethers can be prepared by the partial dehydration of excess alcohol. The alcohol in excess and concentrated tetraoxosulphate (vi) acid 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 ethene occurs.



II - controlled catalytic hydration of olefins:



2-isopropoxy propane

4. Uses of ethylene oxide

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.