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Chem 102 Assignment

1. Give the IUPAC names of the following organic compounds.

i) CH_3OCH_3 - methoxy methane

ii) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxy ethane

iii) $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ - Butoxy butane

iv) $\text{CH}_3\text{CH}_2\text{OCH}_3$ - methoxy ethane

v) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxy propane.

2. Discuss the properties of ethers.

a) Physical states: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

b) Solubility: Ethers are less soluble in water than are the corresponding alcohols. Lower molecular 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.

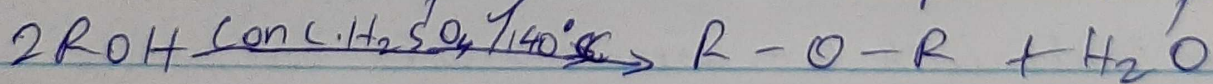
c) Density: Most of the simple ethers are less dense than water, although the density increases with increasing relative molecular mass and some of the aromatic ethers are in fact denser than water.

d. Boiling point: Low molecular mass ethers have a lower boiling point than the corresponding alcohols ~~but these~~ ~~are~~ The boiling point of ethers tend to approximate those of hydrocarbons of same relative molecular mass.

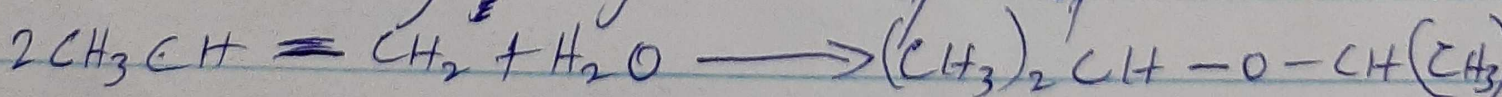
e. Reactivity: Ethers are inert at moderate temperature. Their inertness at moderate temperatures leads to their wide use as reaction media.

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

a. Partial dehydration of alcohols: simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is in excess and concentrated tetraoxosulphate(VI) acid is heated at a carefully maintained temperature of 140°C .



b. Controlled catalytic hydration of olefins.



4 State three uses of ethylene oxide

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

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

c Ethylene oxide is used as a gaseous sterilizing agent.