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Matric No: 19/ENG 05/036

CHM 102

Assignment

1. Give the IUPAC names of the following organic compounds

CH_3OCH_3 — Methoxymethane / Dimethyl ether

$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ — Ethoxyethane / Diethyl ether

$(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ — Butoxymethane

$\text{CH}_3\text{CH}_2\text{OCH}_3$ — Methoxyethane / Methyl ethyl ether

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ — Ethoxypropane / Ethyl propyl ether

2. Discuss the Properties of ethers

Answer

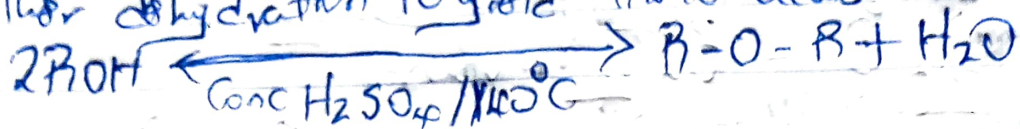
- i. Physical States: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.
- ii. Solubility: Ethers are less soluble in water than are the corresponding alcohols. They are miscible with most organic solvents.
- iii. 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.
- iv. Boiling Point: 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.
- v. 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. Discuss explicitly two methods of preparing ethers and show equations of reaction.

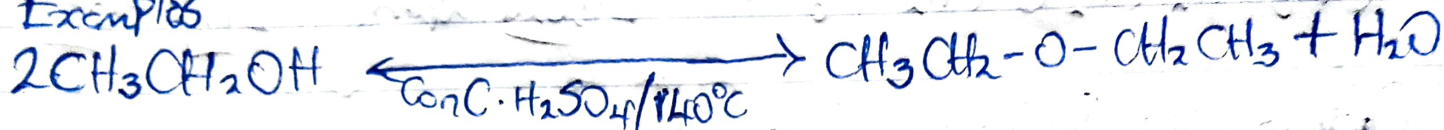
Answer

- i. Partial dehydration of alcohols: Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is in excess and conc

tetraoxosulphate (vi) acid is heated at a carefully maintained temperature of 140°C . This process is known as continuous ethylation. If excess alcohol is not used, the temperature is as high as $170^{\circ}\text{--}180^{\circ}\text{C}$, further dehydration to yield alkene occurs.

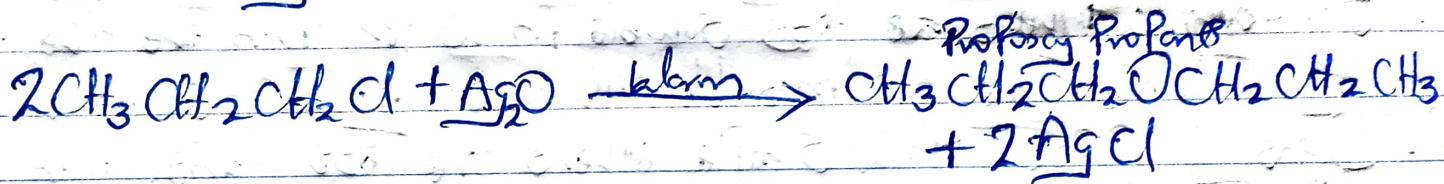
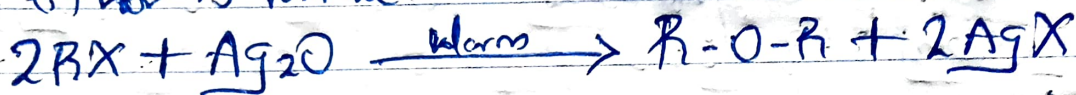


Examples



3. From haloalkanes and dry silver (I) oxide

When an alkyl halide is heated with dry silver (I) oxide, an ether is formed.



4. State three uses of ethylene oxide.

Answer -

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, plasticizers, plasticizers and several synthetic textiles.

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