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CHM 102

- 1.) $\text{CH}_3\text{OCH}_3 \rightarrow$ Methoxyethane
 $(\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3) \rightarrow$ Ethoxyethane
 $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O} \rightarrow$ Butoxyethane
 $\text{CH}_3\text{CH}_2\text{OCH}_2 \rightarrow$ Methoxyethane
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3 \rightarrow$ Ethoxypropane.

2.) Properties of ethers

i) Physical States - At room temperature, ethers are colourless, inert liquids with pleasant odours. The aliphatic ethers are highly flammable gases or volatile liquids.

ii) Solubility: Ethers are less soluble in water than the corresponding lower molecular weight ethers such as methoxyethane are fairly soluble in water but as the hydrocarbon content of the molecules increases there is a rapid decline in solubility.

(iii) Density:

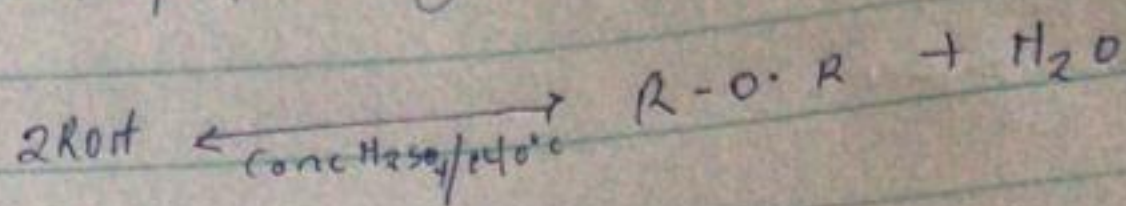
Most of the simple ethers are less dense than water, as the density increases with increasing relative molecular mass and of the aromatic ethers are in fact denser than water.

(iv) Boiling Point: Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyllarger than four carbon atoms, the reverse is true.

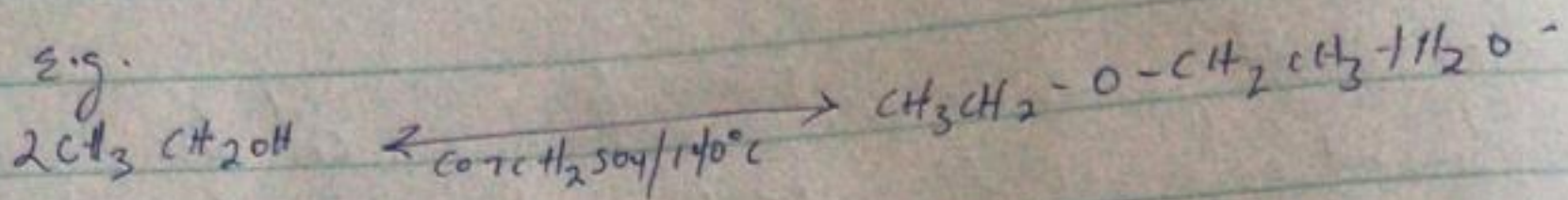
(v) Reactivity: Ethers are inert at temperature. Their inertness at temperature leads to their wide use as reaction media.

3) Partial dehydration of alcohols

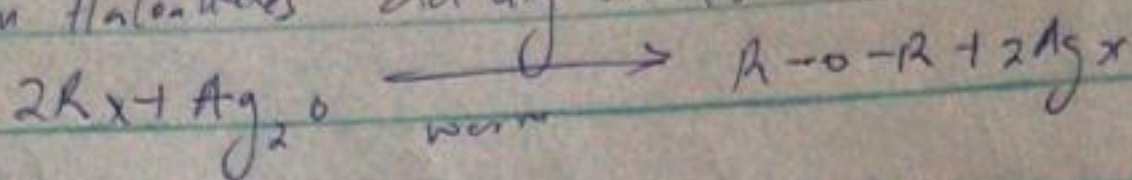
Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is excess and concentrated H_2SO_4 acid and is heated at a carefully maintained temperature of $140^\circ C$. This process is known as catalytic etherification. If excess alcohol is not used the temperature is as high as $170^\circ - 180^\circ C$; further dehydration to yield alkene occurs.



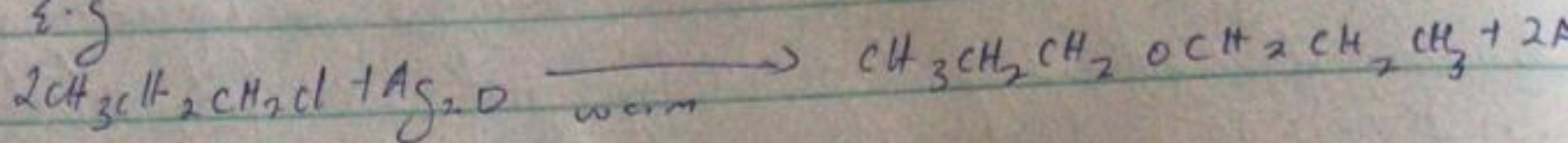
e.g.



(ii) from haloalkanes and dry Silver(I) oxide



e.g.



(4)(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 agents, plastics, plasticizers and several synthetic textiles.

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