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CHM 102

1. i. CH_3OCH_3 → Methoxymethane
   ii. $CH_3CH_2OCH_2CH_3$ → Ethoxyethane
   iii. $(CH_3CH_2CH_2CH_2)_2O$ → Butoxymethane
   iv. $CH_3CH_2OCH_3$ → Methoxyethane
   v. $CH_3CH_2CH_2OCH_2CH_3$ → Ethoxypropane

2. i. Physical states: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are volatile liquids.

   ii. Solubility: Ethers are less soluble in water than the corresponding alcohols.

   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 a moderate temperature. That allows wide use as reaction media.

3. partial dehydration of alcohols
Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated tetraoxosulphate(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°C, further dehydration to yield alk occurs.

$$2ROH \xleftarrow{Conc.H_2SO_4/140^\circ C} R-O-R + H_2O$$

ii. Controlled catalytic hydration of Olefins

$$2CH_3CH=CH_2 + H_2O \longrightarrow (CH_3)_2CH-O-CH(CH_3)_2$$

2-isopropoxypropane

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 nonion emulsifying agents, plastics, plasticizers and several synthetic textiles.
iii. Ethylene oxide is used as a gaseous sterilizing agen