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chem 102

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

$\text{CH}_3\text{OCH}_3$  - Methoxymethane

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

$\text{C}_4\text{H}_9\text{OCH}_3$  - 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. Discuss the properties of ethers

General properties

Physical state - Ethers are colourless, neutral liquids with pleasant odour at room temperature

Solubility - Ethers are less soluble in water than are the corresponding alcohols

Density - Most of the simple ethers are less dense than water, although <sup>the</sup> density increases with increasing relative molecular mass.

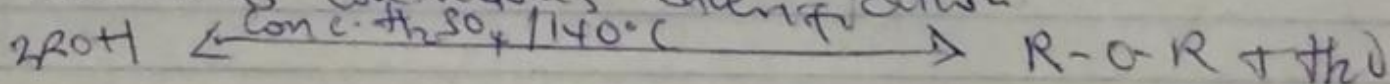
Boiling point - Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than five carbon atoms, the reverse is true.

Reactivity - Ethers are inert at moderate temperatures

3. Discuss briefly two methods of preparing ethers and show equations of reactions.

i. Partial dehydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is excess and conc.  $\text{H}_2\text{SO}_4$  (v.l) is used. It is heated at a temperature which maintains temperature of  $\text{H}_2\text{O}$ , this process is known as catalytic dehydration.



ii) Controlled catalytic hydration of ethylene  
 $2C_2H_4 + H_2O \rightarrow (C_2H_5)_2CH-O-CH_2(C_2H_5)_2$   
2-isopropanol propane

- i) State three 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.