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CHM 102 Assignment on Ethers.

1) CH_3OCH_3 - Methoxymethane

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

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

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

v) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxypropane

2) There are physical and chemical properties of ethers, but the general properties are:

At room temperature, ethers are colourless, neutral liquids with pleasant odours.

The lower aliphatic ethers are highly flammable gases or volatile liquids. Ethers are

less soluble in water than the corresponding alcohols. Lower molecular weight ethers

are fairly soluble in water since the molecules are able to form hydrogen bonds with the

water molecules but as the hydrocarbon content increases, there is rapid decline in solu-

bility. They are miscible with most organic solvents. Most ethers are less dense than

water, but the density increases with increasing relative molecular mass and some

aromatic ethers are denser than water. Also, low molecular mass ethers ^{have a lower} ~~are less dense~~

~~boiling~~ point than the corresponding alcohols but those ethers containing alkyl radicals

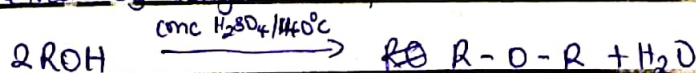
larger than four carbon atoms, the reverse is true. Ethers are inert at moderate tempe-

ratures ^{commonly} leads to their wide use as reaction media. Simple ethers are not found in nature.

3) ① Dehydration of alcohols: In the presence of sulphuric acid, dehydration of ethanol yields

ethoxyethane at 413K. This is an ideal method of preparation through primary alcohols. Pre-

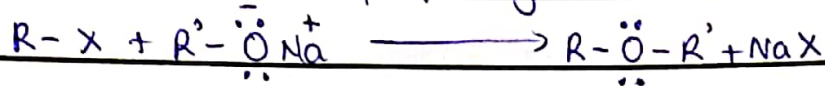
paration of ethers by dehydration of an alcohol is a nucleophilic substitution reaction.



② Williamson's synthesis: When an alkyl halide reacts with sodium alkoxide, ether

is formed. This reaction is known as Williamson's synthesis. The reaction generally

follows the S_N2 mechanism for primary alcohols:



4.) Three (3) uses of ethylene oxide are:

- Ethylene ^{oxide} is a flammable gas used to make other chemicals such as ethylene glycol.
- It is emitted from fossil fuels such as petroleum, natural gas, etc.
- It is used to make antifreeze, adhesives, fumigants and pesticides as well as sterilization agents for medical equipment.