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(1). IUPAC names of organic compounds.

* CH3OCH3- Methoxymethane.

* CH3CH2OCH2CH3- Ethoxymethane.

* (CH3CH2CH2CH2)2O- Butoxymethane.

* CH3CH2OCH3- Methoxymethane.

* CH3CH2CH2OCH2CH3- Ethoxypropane.

(2). Properties of Ethers:

~ Boiling point: Low molecular mass ethers have a low boiling point than the corresponding alcohols. The boiling point of ethers tend to approximate those of hydrocarbons of the same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase because hydrogen expected for association through hydrogen bond is not readily available.

~ Solubility: Ethers are more soluble in water than in alcohols. Low molecular mass ethers are partially soluble in water and this is because the molecules are able to form hydrogen bonds with the water molecules but as hydrocarbon increases, there is an equally rapid decrease in solubility.

~ Density: Most ethers are less dense with water, although density increases with relative molecular mass and some of the aromatic ethers are in fact denser than water.

~ Reactivity: Ethers are inert at moderate temperature and this leads to their wide use as reaction media. Simple ethers are not found commonly in nature but the linkage is present in natural products such as sugars, cellulose and starches.

~ Physical states: At room temperature, ethers are colourless, neutral and they have pleasant odours. Lower aliphatic ethers are highly flammable gases or volatile liquids.

(3). Two methods of preparing ethers with reactions:

a. Controlled catalytic hydration of olefins.

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

2-isopropoxypropane.

b. 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 140ºC. This process is known as continuous etherification. If excess alcohol is not used, the temperature is as high as 170-180ºC, further dehydration to yield alkene occurs.

$$2ROH \xrightarrow[\text{Conc. } H_2SO_4/140^oC]{} R-O-R + H_2O$$

E.g $2CH_3CHOH \xrightarrow{} CH_3CH_2-O-CH_2CH_3 + H_2O$

(4). Uses of ethyleneoxide.

~ It is used as a gaseous sterilizing agent.

~ It is used as an intermediate in the hydroxylic manufacture of ethylene glycol.

~ It is used in the preparation of non-ionic emulsifying agents, plastics, plasticizers and several synthetic textiles.