

Propanone (aldehyde)

Name: Nkamru Precious Timothy

Dept: MBBS

Course Code: GS Chem 102

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1. Give the IUPAC names of the following Organic Compounds:

- (i) CH_3OCH_3 (ii) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
(iii) $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ (iv) $\text{CH}_3\text{CH}_2\text{OCH}_3$ (v) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$

2. Discuss the properties of ethers

3. Discuss explicitly two methods of preparing ethers and show equations of reaction

4. State three uses of ethylene oxide.

Answers

(i) methoxymethane - CH_3OCH_3

(ii) Ethoxy ethane - $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

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

(iv) Methoxy ethane - $\text{CH}_3\text{CH}_2\text{OCH}_3$

(v) Ethoxy propane - $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$

(a) 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.

(b) At physical state: At room temperature, ethers are colourless, neutral liquids with unpleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

(d) Solubility: Ethers are less soluble in water than are the corresponding alcohols. Lower molecular weight ether such as methyl methyl ether and methyl ethyl ether are fairly soluble in water since the molecules are able to form hydrogen bonds with the water molecules but as the hydrocarbon content of the molecules increases, there is a rapid decline in solubility. They are miscible with most organic solvents.

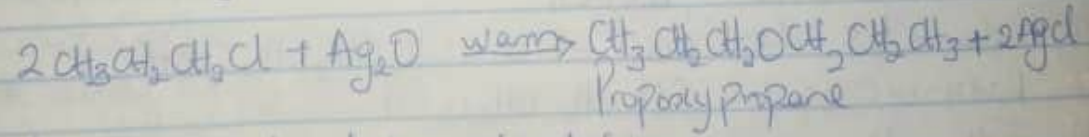
(d) Reactivity: Ethers are inert at moderate temperature. Their inertness at moderate temperature leads to their wide use as reaction media. Simple ethers are not found commonly in nature but the ether linkage is present in such natural products as sugar, starch and cellulose.

(e) Boiling point: Low molecular mass ethers have low boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true. The boiling point of ethers tend to approximate those of hydrocarbons of same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase as there are no suitably available

available hydrogen for association through hydrogen bonds.

(3a) From haloalkanes and dry silver oxide

$$2R-X + Ag_2O \xrightarrow{\text{warm}} R-O-R + 2AgX$$



(b) Controlled Catalytic hydration of olefins

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

2 - isopropoxypropane

- (i) ethylene oxide is used as a gaseous sterilizing agent
- (ii) ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol.
- (iii) It is used in the preparation of non ionic emulsifying agents, plastics, plasticizers and several synthetic textiles.