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19/MHS01/241
MEDICINE AND SURGERY
CHM 102 Quarantine assignment. II
13th April, 2020.

1 Give the IUPAC names of the following organic compounds:

a. CH_3OCH_3 → Methoxymethane

b $CH_3CH_2OCH_2CH_3$ → ~~meth~~ Ethoxyethane

c $(CH_3CH_2CH_2CH_2)_2O$ → Butoxybutane

d $CH_3CH_2OCH_3$ → Methoxyethane

e $CH_3CH_2CH_2OCH_2CH_3$ → ~~Ethy~~ Ethoxypropane

2 Discuss the properties of ethers.

a Physical state:
At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

b Solubility:
Ether are less soluble in water than are the corresponding alcohols. Lower molecular weight ethers such as methoxymethane and methoxyethane are fairly soluble in water. Since the molecules are able to form hydrogen bonds with the water molecules, the hydrocarbon content of the molecules increases, there is a rapid decline in solubility. They are miscible with most organic so

c) Density:

Most of the simple ethers are less dense than water at
The density increases with increasing relative molecular ma
Some of the aromatic ethers are more denser than water

d) Boiling point:

Low molecular mass ethers have a lower boiling point than
corresponding alcohols but those ethers containing alkyl radicals h
than four carbon atoms the reverse is true. The boiling point of
tend to approximate those of hydrogen bonds of some relative
molecular mass from which it can be concluded that the molecule
not associated in the liquid phase as there are no suitably ove
hydrogen for association through hydrogen bonds

e) Reactivity:

Ethers are inert at moderate temperature. Their inertness at
moderate temperatures leads to their wide use as a reaction medi
Simple ethers are not found commonly in nature but the ether
linkage is present in such natural product as sugars, starches an
cellulose.

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

a) Partial dehydration of alcohols:

Simple ethers are manufactured from alcohols by catalytic dehydrat
The alcohol is in excess and concentrated (H_2SO_4) tetraoxosulphate (
acid is heated at a carefully maintained temperature of 140°C. This
process is known as continuous etherification. If excess alcohol
not used, the temperature is as ~~high~~ high as 170°C-180°C, th
dehydration to yield alkene occurs

$$2ROH \xrightarrow{conc\ H_2SO_4,\ 140°C} R-O-R + H_2O$$

Example

$$2CH_3CH_2OH \xrightarrow{conc\ H_2SO_4\ /140^\circ C} CH_3CH_2-O-CH_2CH_3$$

2. From Haloalkanes and dry silver (I) oxide

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

$$2CH_3CH_2CH_2Cl + Ag_2O \xrightarrow{water} CH_3CH_2CH_2OCH_2CH_2CH_3 + 2AgCl$$

Propoxypropane

4. State four uses of ethyleneoxide

Uses of ethyleneoxide.

a) It is used as an intermediate in the hydrolytic manufacture of ethene glycol

b) It is used in the preparation of nonionic emulsifying agents, plastics, plasticizer and several synthetic textiles.

c) It is used as a gaseous sterilizing agent.