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19/MHSO1/241

MEDICINE AND SURGERY

CHM102 Quantitative assignment II

13th April, 2020.

1 Give the IUPAC names of the following organic compounds:

a. $\text{CH}_3\text{OCH}_3 \rightarrow$ Methoxy ethane

b. $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3 \rightarrow$ Methyl ethoxyethane

c. $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O} \rightarrow$ Butoxymethane

d. $\text{CH}_3\text{CH}_2\text{OCH}_3 \rightarrow$ Methoxyethane

e. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3 \rightarrow$ Ethoxypropane

2 i) Discuss the properties of ethers.

a) Physical state:

At room temperature, ethers are colourless neutral liquids with pleasant odour. The lower aliphatic ethers are highly flammable gases or volatile liquids.

a

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 molecule increases, there is a rapid decline in solubility. They are insoluble with most organic solvents.

c) Density:

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

d) Boiling Point:

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

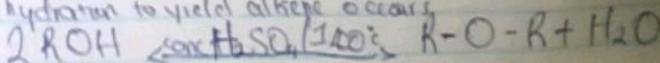
e) Reactivity:

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

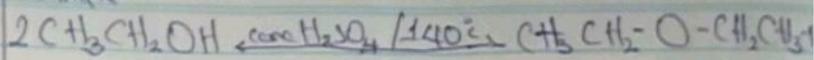
3) Discuss explicitly two methods of preparing ethers and show equations of reactions.

a) Partial dehydration of alcohols:

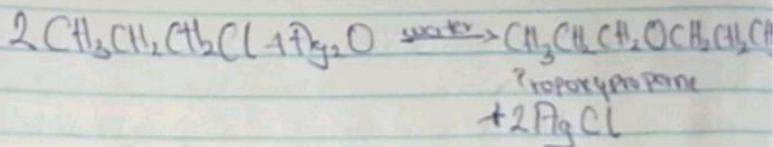
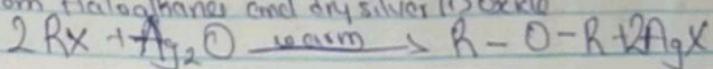
Simple ethers are manufactured from alcohols by partial dehydration. The alcohol is in excess and concentrated (H_2SO_4) fuming sulphuric acid is heated at a carefully maintained temperature of 140° . This process is known as continuous etherification. If excess alcohol not used, the temperature is too high $170^\circ - 180^\circ$, dehydrogenation to yield alkene occurs.



Example



From halogenoalkanes and dry silver (I) oxide



a) State four uses of ethylene oxide.

Uses of ethylene oxide.

a) It is used as an intermediate in the hydrolytic manufacture of ethylene 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.