

NAME - ILORI KOLAWOLE ADC-SALIND

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Type - CHEM 103 Assignment

MTT - AGRICULTURAL SCIENCE

1) Give the IUPAC names for the following organic compound

a) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
Methyl Methoxyethane

b) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_4\text{OC}_2\text{H}_5$
~~Diethyl ether~~ Diethoxyethane

c) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_4\text{OC}_2\text{H}_4\text{OC}_2\text{H}_5$

2) Discuss the properties of ethers
General properties

1) Physical states

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

2) Solubility

Ethers are less soluble in water than are the corresponding alcohols - lower molecular weight ethers such as methoxyethane and methyl ethane 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.

3) Density

~~Most~~ 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

Discuss the same

4) Boiling point

Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl endocyclic groups have lower boiling points. The reverse is true. The boiling point of ethers tend to approximate that of hydrocarbons of same relative molecular mass from which it can be guessed that the molecules are not associated in the liquid phase as there are no suitably available hydrogen for association through hydrogen bonds.

5) Reactivity: Ethers are inert at moderate temperatures. Their reactivity at moderate temperatures leads to their uses as inert reaction media. Simple ethers are not found commonly in nature but the ether linkage is present in such natural products as Sugars, cereals and Cellulose.

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

Manufacture and preparation of ethers

1) General dehydration of alcohols

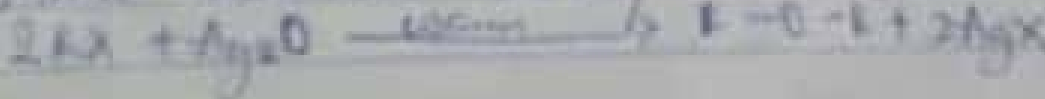
Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is excess and concentrated phosphoric acid is heated at a carefully maintained temperature of 140°C . The process is known as continuous etherification. It occurs slowly so not used. The temperature is a little higher i.e. $170-200^\circ\text{C}$ for the dehydration to yield alkene ethers.



Example



2) from Haloalkanes and dry Silver (I) oxide



Some of the uses of ethylene oxide
Ethylene oxide is used as a gaseous sterilizing agent
Ethylene oxide is used as the monomer in the
polymerization of ethylene glycol
Ethylene oxide is used in the preparation of various
emulsifying agents, plastics, detergents and animal
growth factors.