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DEPARTMENT: OPTOMETRY

COLLEGE: MHS

COURSE CODE: CHM102

ASSIGNMENT TITLE: ASSIGNMENT ON ETHER

1. Give the IUPAC names of the following organic compounds

CH3OCH3 – Methoxymethane

CH3CH2OCH2CH3 – Ethoxyethane

(CH3CH2CH2CH2)2O – Butoxymethane

CH3CH2OCH3 - Methoxyethane

CH3CH2CH2OCH2CH3 – Ethoxypropane

1. Discuss the properties of ethers
* PHYSICAL STATES:

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

* SOLUBILITY:

 Ethers are less soluble in water than are the corresponding alcohols. Lower molecular weight such as methoxymethane and methoxyethane 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.

* 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.

* BOILING POINT:

 Low molecular mass ethers have a lower 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 some 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 hydrogen for association through hydrogen bonds.

* REACTIVITY:

Ethers are inert at moderate temperature. Their inertness at moderate temperatures lead to their wide use as reaction media.

Simple ethers are not found commonly in nature but ether linkage is present in such natural products as sugars, starches and cellulose.

1. Discuss explicitly two methods of preparing ethers and show equations of reaction.
* Partial dehydration of alcohols:

 Simple ethers are manufactured from alcohols by catalytic dehydration. In the presence of concentrated tetraoxosulphate(vi) acid, dehydration of ethanol yields ethoxyethane. The alcohol in excess and concentrated tetraoxosulphate(vi) acid is heated at a carefully maintained temperature of 140°C, this process is known as etherification. If excess alcohol is not used and the temperature is as high as 170 - 180°C, further dehydration occurs to yield alkene.

Example:

2CH3CH2OH Conc H2SO/140°C4 CH3CH2-O-CH2CH3 + H2O

* From Haloalkanes and dry silver (i) oxide:

When alkyl halide reacts with dry silver (I) oxide ether is formed.

Example:

2RX + Ag2O warm R-O-R + 2AgX

2CH3CH2CH2Cl + Ag2O warm CH3CH2CH2OCH2CH2CH3 + 2AgCl

 Propoxypropane

1. State three uses of ethylene oxide
* Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol.
* Ethylene oxide is used as gaseous sterilizing agent.
* Ethylene oxide is also used as fumigant in certain agricultural products and as a sterilant for medical equipment and supplies.