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MATRIC NUMBER; 19/MHS01/042

COURSE; CHEM 102

ASSIGNMENT ON ETHER

1. i. CH3OCH3 ; Methoxymethane

ii. CH3CH2OCH2CH3 ; Ethoxyethane

iii. (CH3CH2CH2CH2)2O; Butoxymethane

iv. CH3CH2OCH3; Methoxyethane

v. CH3CH2CH2OCH2CH3; Ethoxypropane

1. Ethers have both physical and chemical properties which are discussed below;
2. Physical properties
3. At room temperature, they are colourless neutral liquids with pleasant odours.
4. They are less soluble in water than their corresponding alcohols, with a rapid decline in solubility with increase in hydrocarbon content.
5. They are miscible in most organic solvents.
6. Most are less dense than water, but density increases with increasing Relative molecular mass.
7. Low molecular mass ethers have lower boiling points than their corresponding alcohols with those with more than four carbon atoms having high boiling points.
8. They are unreactive at moderate temperatures.
9. Chemical properties
10. Autoxidation;

 Ethers undergo self-oxidation in the presence of oxygen to form unstable peroxides as shown in the equation below;

CH3CH2OCH2CH3 + O2 CH3CH2-O-CH(OOH)CH3

1. Cleavage; this refers to chemical substitution reactions that lead to the cleavage of ethers.

Case 1;

 Ethers are decomposed by heat in the presence of alumina catalysts to form olefins and water, primarily.

CH3CH2-O-CH3 Al2O3/heat CH3CH=CH2 + H2O

Case 2;

 Ethers undergo carbon-oxygen fission on heating with strong acids like nitric, hydriodic and hydrobromic acids. If only one bond is cleaved alcohol is a product but alkyl derivatives are gotten in either case.

CH3CH2OCH2CH3  HI/reflux CH3CH2I + CH3CH2OH

CH3CH2OCH2CH2CH3 2HI/reflux CH3CH2I + CH3CH2CH2I + H2O

1. Preparation of Ethers;
2. Partial dehydration of alcohols; simple ethers are manufactured from alcohols by catalytic dehydration. Excess alcohol and concentrated H2SO4 is heated at a temperature of 1400C in a process known as continuous etherification.

2ROH conc. H2SO4/1400C R-O-R + H2O

1. Controlled catalytic hydration of olefins; water is added to olefins to produce ethers in the presence a catalyst.

2CH3CH=CH2 + H2O (CH3)2CH-O-CH(CH3)2

1. Uses of ethylene oxide;
2. It is a gaseous sterilizing agent
3. It is used as an intermediate in the hydrolytic manufacture of ethylene glycol
4. It is used in the preparation of non-ionic emulsifying agents, plastics, plasticizers and several synthetic textiles.