

CHM 102 ASSIGNMENT

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DEPT: PETROLEUM ENGINEERING

MATRIC NO: 19/ENG07/018

Answer

(1) Give IUPAC name.

(a) CH_3OCH_3 : Dimethyl ether

(b) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$: Diethyl ether

(c) $[\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2]_2\text{O}$: Ethoxypropoxy Butoxy methane

(d) $\text{CH}_3\text{CH}_2\text{OCH}_3$: ethyl methyl ether

(e) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$: Alkoxy alkanes

(2) Discuss the properties of ethers.

(a) Physical states.

At room temperature, ethers are colourless, neutral liquids with pleasant odours.

(b) Solubility.

Ethers are less soluble in water than all the corresponding alcohol.

(c) Density

Most of the simple ethers are less dense than water, although the density increases with increasing relative mass and some of the aromatic ethers are in fact denser than water.

(d) Boiling point.

Low molecular mass ethers have a lower boiling than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true.

(e) Reactivity.

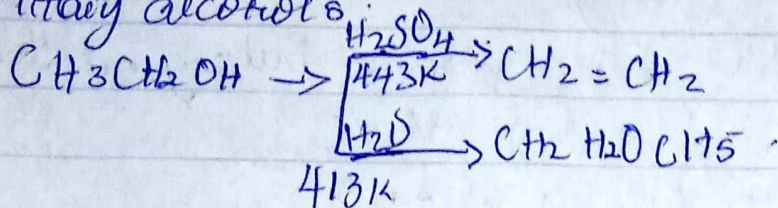
Ethers are inert at moderate temperatures, which leads to their wide use as reaction media.

(3)

(a) Preparation by Dehydration of Alcohols: In the presence of protic acids, alcohols undergo dehydration to produce alkenes and ethers under different conditions. E.g.

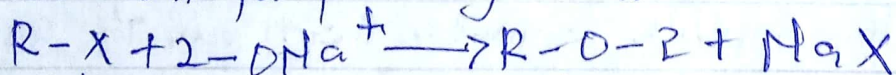
In the presence of sulphuric acid, dehydration of ethanol at 443K yields ethene whereas it yields ethoxyethane at 413K. This is an ideal method of preparation through

primary alcohols.



The preparation of ethers by dehydration of alcohol is nucleophilic substitution reaction.

(b) Preparation by william synthesis: In this method an alkyl halide is reacted with sodium alkoxide which leads to the formation of ether. The reaction generally follow $\text{S}_\text{N}2$ mechanism for primary alcohol.



(4) Uses of ethylene oxide.

(a) Used in production of ethylene glycols for engine antifreeze.

(b) It is used as an intermediate in the production of other chemicals used to manufacture fabrics, carpets, pillows etc.

(c) It is used as a fumigant in certain agricultural products.