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 MATRIC NO: 1911MITS011206
 COURSE: CHEM 102

Organic Compounds	IUPAC Names
a) CH_3OCH_3	Methoxymethane
b) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$	Ethoxyethane
c) $(\text{CH}_3\text{CH}_2\text{CH}_2\text{O})_2\text{O}$	Butoxymethane
d) $\text{CH}_3\text{C(CH}_3)_2\text{OCH}_3$	Methoxyethane
e) $\text{CH}_3\text{CH}_2\text{C(CH}_3)_2\text{OCH}_3$	Ethoxypropane

PROPERTIES OF ETHERS

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

1. PHYSICAL STATES

Ethers are less soluble in water than corresponding alcohols. Lower molecular weight ethers such as methoxymethane and ethoxyethane are fairly soluble in water since the molecules are able to form hydrogen bonds with 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.

2. SOLUBILITY

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.

3. DENSITY

Boiling Point:

Lower molecular mass ethers have a low 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 same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase as there are no suitable available hydrogen for association through hydrogen bonds.

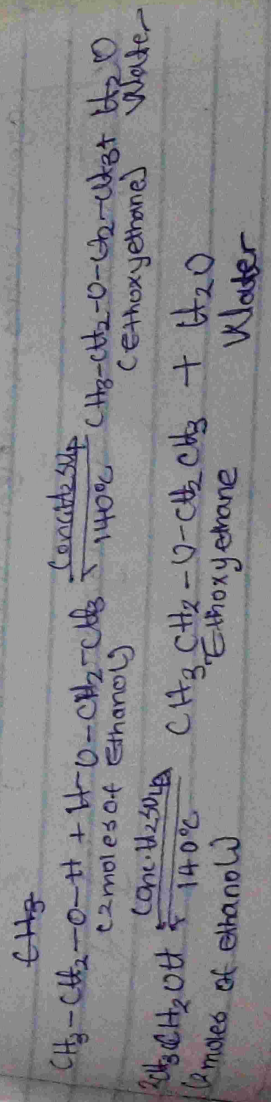
REACTIVITY

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

METHODS OF PREPARING ETHERS WITH EQUATIONS

1. Partial Dehydration of Alcohols
Simple ethers are manufactured from alcohols by catalytic dehydrations. The alcohols in excess and concentrated tetraoxosulphate (VI) acid is heated at carefully maintained temperature of 140°C . The process is known as "continuous etherification". If excess alcohol is not used, the temperature is as high as 170°C to 180°C , further dehydration to yield alkene occurs.

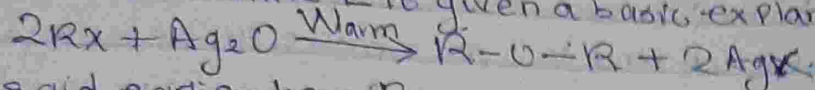
Examples



2 FROM HALOALKANES AND DRY SILVER(I) OXIDE

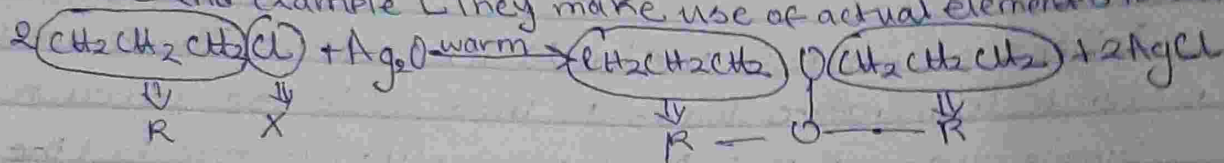
General Formula for Ether $\Rightarrow R-O-R, R-O-Ar, Ar-O-Ar$ where
 $R \Rightarrow$ Alkyl group and $Ar \Rightarrow$ Aryl group.

* In the 1st example [it given a basic explanation]

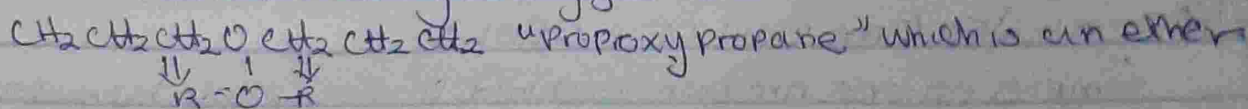


As said earlier here R represents an alkyl group while X represents a halogen. The 2 atoms of the alkyl group displace the silver from its oxide to form an ether as seen above. The 2 atoms of the alkyl group attach themselves to both sides of the single oxygen atom thereby forming an ether.

In the 2nd example [They make use of actual elements to explain]



Here $\text{CH}_2\text{CH}_2\text{CH}_2$ (C_3H_7) is your alkyl group (R) and chlorine in your halogen. The same reaction takes place just like in example 1, 2 atoms of $\text{CH}_2\text{CH}_2\text{CH}_2$ (C_3H_7) displace silver and attach themselves to each side of the single oxygen atom to form:-



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4 USES OF ETHYLENE OXIDE

1) Ethylene oxide is used as an intermediate in the hydrolytic manufacture of Ethylene glycol.

2) Ethylene oxide is used in the preparation of non-ionic emulsifying agents, plastics, plasticizers and several synthetic textiles

Ethylene oxide is used as a gaseous sterilising agent