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19/MHS 11/041

Pharmacy

Chem 102.

1 Give the IUPAC names of the following organic compounds

CH_3OCH_3 - Methoxymethane

$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxyethane

$\text{C}(\text{CH}_3)_2(\text{CH}_2)_2\text{O}$ - Butoxymethane

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2$ - Ethoxypropane

2 Discuss the properties of ethers

There are physical and chemical properties of ethers

a) Physical properties

- An ether molecule has a net dipole moment due to the polarity C-O bonds.

- The boiling points of ethers is comparable to the halogenes not much lower than that of alcohols comparable molecular mass despite the polarity of the C-O bond. The miscibility of ethers with water resembles that of alcohols.

- Ethers molecules are miscible in water. This is attributed to the fact that alcohol, the oxygen of ether can also form hydrogen bonds with water molecules

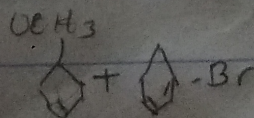
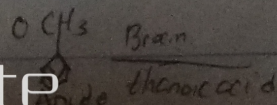
Chemical properties

- cleavage of C-O bond

Ethers are generally very unreactive in nature when an excess of hydrogen halide is added to the ether cleavage of C-O bonds takes place leading to alkyl halides. The order of reactivity is $\text{HI} > \text{HBr} > \text{HCl}, \text{HNO}_3$

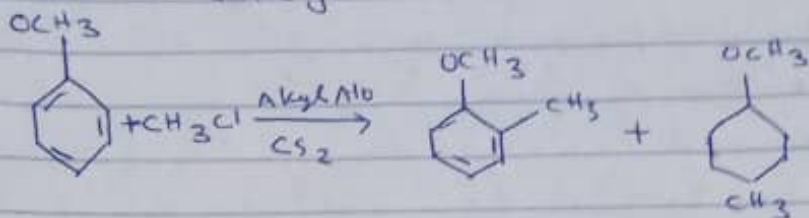
- Halogenation of ethers: Aromatic ethers undergo halogenation ~~change~~ upon the attachment halogen in the presence or absence

of a catalyst



^{Craft's}
* Friedel-Craft's Reaction of Ethers

Aromatic ethers undergo Friedel-Craft's reaction for example addition of alkyl or any group upon the reaction with alkyl or acyl halide in the presence of a Lewis acid as catalyst



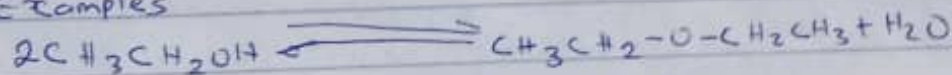
3.) Discuss explicitly two methods of preparing ethers and show equations of reaction.

a) Partial dehydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated tetraoxosulphate (vi) acid is heated at a carefully maintained temperature of 140°C . This process is known as continuous etherification. If excess alcohol is not used, the temperature is as high as $170-180^{\circ}\text{C}$. Further dehydration of yield alkene occurs.



Examples



b) Controlled catalytic hydration of olefins



4.) State three uses of ethylene oxide

a) Ethylene oxide is used as an intermediate in the hydrous manufacture of ethylene

b) glycol

c) Ethylene oxide is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles.

d) Ethylene oxide is used as a gaseous sterilizing agent.