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COMPUTER ENGINEERING
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CHM 102 Assignment on ethers

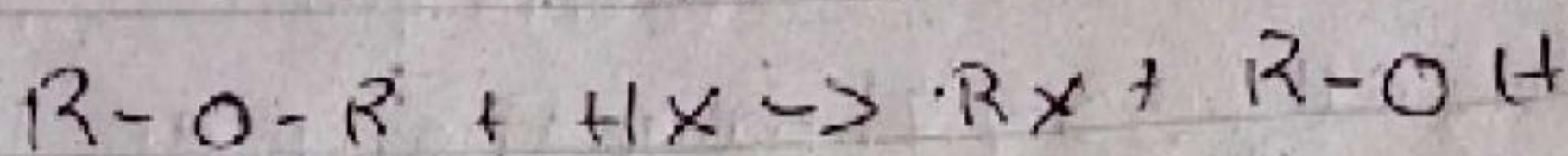
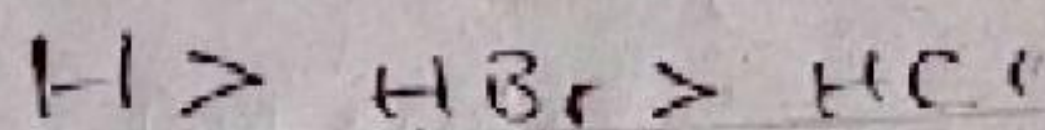
- 1) $\text{CH}_3\text{OCH}_3 \Rightarrow$ methoxymethane
- 2) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3 \Rightarrow$ Ethoxyethane or Diethyl ether
- 3) $\text{C}(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O} \Rightarrow$ 2-methoxypropane
- 4) $\text{CH}_3\text{CH}_2\text{OCH}_3 \Rightarrow$ ethyl methyl ether or methoxyethane
- 5) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3 \Rightarrow$ Ethyl propyl ether

2 Physical Properties

- 1) An ether molecule has a net dipole moment. We can attribute this to the polarity of C-O bonds.
- 2) The boiling point of ethers is comparable to the alkanes. However, it is much lower compared to that of alcohols of comparable molecular mass. This is despite the fact of the polarity of the C-O bond.
- 3) The miscibility of ethers with water resembles those of alcohols.

Chemical Properties

1) Cleavage of C-O bond \Rightarrow Ethers are generally very unreactive in nature. When we add an excess of hydrogen halide to an ether, it leads to the formation of alkyl halides.



2) Electrophilic substitution: The alkoxy group in ether activates the aromatic ring at ortho and para positions for electrophilic substitution reactions such as halogenation.

3) Halogenation reaction of ethers

Aromatic ethers undergo halogenation, for example, bromination, when we add a halogen in the presence or absence of a catalyst.

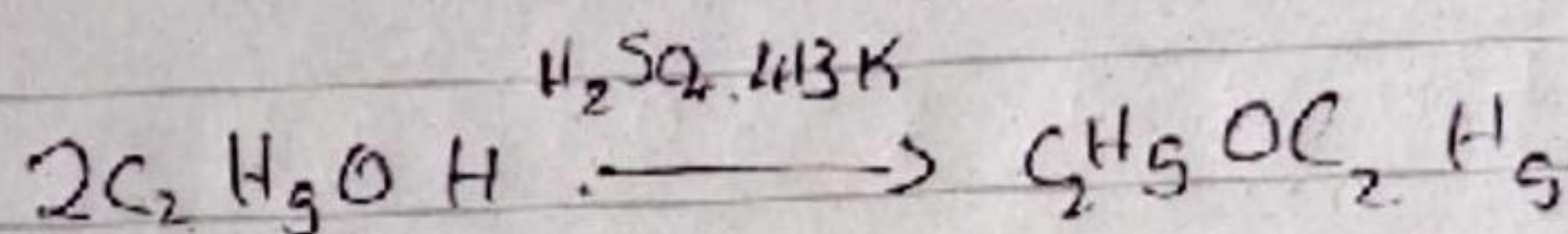
4) Friedel-Craft's reaction of ethers:

Aromatic ethers undergo Friedel-Craft's reaction for example addition of alkyl or acyl group when we introduce it to an alkyl or acyl halide in the presence of a Lewis acid as catalyst.

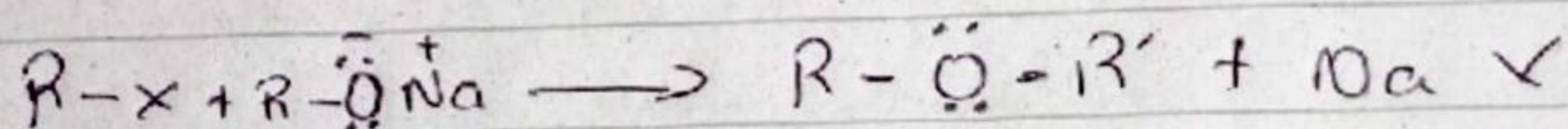
3 methods of ethers

1) Dehydration of alcohols:

In the presence of sulphuric acid, dehydration of ethanol yields ethoxyethane at 413 K. This is an ideal method of preparation through primary alcohols. Preparation of ethers by dehydration of an alcohol is a nucleophilic substitution reaction.



2) Williamson's Synthesis: When an alkyl halide reacts with sodium alkoxide, ether is formed. This reaction is known as Williamson's synthesis. The reaction generally follows the S_N2 mechanism for primary alcohols.



4 ~~Ethylene~~

- Ethylene oxide is used to make anti-freeze, adhesives, detergents, polyester, fumigants and pesticides.
- Ethylene oxide is used as a sterilant for medical equipment.
- It is used as a fumigant in certain agricultural products.