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Geology

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1a. Ethanol

b. 2-Butanol

c.

d. ethyl methyl ether

e. ethyl propyl ether

2. Physical Properties of Ethers

1. An ether molecule has a net dipole moment due to the polarity of C-O bonds.
2. The boiling point of ethers is comparable to the alkanes but much lower than that of alcohols of comparable molecular mass despite the polarity of the C-O bond. The miscibility of ethers with water resembles those of alcohols.
3. Ether molecules are miscible in water. This is attributed to the fact that like alcohol, the oxygen atom of ether can also form hydrogen bonds with a water molecule.

Chemical Properties of Ethers

Ethers generally undergo chemical reactions in two ways:

1. 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 bond takes place leading to the formation of alkyl halides. The order of reactivity is given as HI>HBr>HCl

**R-O-R + HX → RX + R-OH**

2. Electrophilic Substitution

The alkoxy group in ether activates the aromatic ring at ortho and para positions for electrophilic substitution. Common electrophilic substitution reactions are halogenation, Friedel Craft’s reaction etc.

3. Halogenation of Ethers

Aromatic ethers undergo halogenation, for example, bromination, upon the addition halogen in the presence or absence of a catalyst.

### ****3.Preparation of Ethers by Dehydration of Alcohols****

In the presence of protic acids (sulphuric acid), alcohols undergo dehydration to produce alkenes and ethers under different conditions.

### ****Preparations of Ethers by Williamson Synthesis****

Williamson synthesis is a method for the preparation of symmetrical and asymmetrical ethers in laboratories. In this method, we carry out a reaction of an alkyl halide with sodium alkoxide which leads to the formation of ether

1. An important use of ethylene oxide is the sterilization of medical equipment, including the sterilization of personal protective equipment used by doctors and hospitals across the country.

**b.production of other chemicals** used to manufacture products, such as fabrics for clothes, upholstery, carpet and pillows.

c. It is used to produce ethylene glycols for **engine antifreeze** that keeps our automobiles performing