lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true.

- Reactivity: ethers are inert at modern temperature.

3) Methods of manufacture of ethers

a) Partial dehydration of alcohols: Simple ethers are manufactured from alcohol by catalytic dehydration. Alcohol in excess and concentrated tetraoxosulphate (vi) acid is heated at a carefully maintained temperature of 140°C this process is known as continous etherification. If excess alcohol is not used, the temperature is as high as 170°-180°C, further dehydration to yield alkene occurs.

$$2ROH \xrightarrow{\text{conc } H_2SO_4, 140^\circ C} R-O-R + H_2O$$

b) Controlled catalytic hydration of Olefins: The controlled catalytic hydration of olefins will yield ethers.

$$2CH_3CH=CH_2 + H_2O \longrightarrow (CH_3)_2CH-O-CH(CH_3)_2$$

4) Uses of ethylene oxide

- It is used as a gaseous sterilizing agent
- It is used as an intermediate in the hydrolytic manufacture of ethylene glycol

- It is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and severed synthetic textiles

CHEMISTRY Assignment 2

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1 CH_3OCH_3 → Methoxymethane
$CH_3CH_2OCH_2CH_3$ → Ethoxyethane
$(CH_3CH_2CH_2CH_2)_2O$ → Butoxy methane
$CH_3CH_2OCH_3$ → Methoxyethane
$CH_3CH_2CH_2OCH_2CH_2$ → Ethoxy propane

2 General properties of Ethers

• Physical states: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases

• Solubility: Ethers are less soluble in water than are the corresponding alcohols. lower molecular weight ethers are fairly soluble in water since the molecules are able to form hydrogen bonds with the water molecules but as the hydrocarbon content increases there is a rapid decline in solubility

• Density: Most of the simple ethers are less dense than water. The density increases with increasing RAM and some aromatic ethers are denser than water.

• Boiling point: Low molecular mass esters have a