

Energetic Chemistry
19/ANHSOL/166
Chem 102

Compounds	IUPAC name
a) CH_3OCH_3	Methoxymethane
b) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$	Ethoxyethane
c) $[\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2]_2\text{O}$	Dioxyethane
d) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$	Methoxyethane
e) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$	Ethoxypropane

2.1) Physical state

- a) At room temperature, ethers are colorless, neutral liquids with pleasant odours.
b) The highly aliphatic ethers are highly flammable gases or volatile liquids.

ii) Solubility

- a) They are less soluble in water than in corresponding alcohol.
b) Lower molecular weight ethers, such as methoxymethane, are fairly soluble in water since the molecules are able to form hydrogen bonds with water molecules. However, a hydrocarbon content of the molecules there's a decrease in solubility.
c) They are miscible with most organic solvents.

iii) Density

Most simple ethers are less dense than water. Density increases with increasing relative molecular mass. Some aromatic ethers are denser than water.

iv) Reactivity

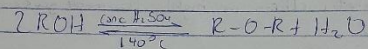
- a) They are inert at moderate temperature.
b) Their inertness at moderate temp. leads to their use as reaction media.

v) Boiling point

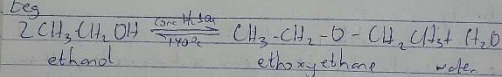
-) Low molecular mass ethers have lower boiling points than the corresponding alcohol. For ethers containing alkyl radicals larger than 4 carbons above, the reverse is true.

vi) Partial dehydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. Continuous esterification occurs which is excess alcohol and conc. H_2SO_4 heated at a carefully maintained temp of 140°C . In place of excess alcohol, temperature is increased to $170^\circ\text{C}-180^\circ\text{C}$ to yield alkenes.



Eg



ii) From haloalkanes and Ag-silver(I) oxide
General ether formula $\rightarrow \text{R-O-R}$, R-O-Ar , Ar-O-Ar
 $\text{R} \rightarrow$ alkyl group, $\text{Ar} \rightarrow$ Aryl group
 $2\text{R-X} + \text{Ag}_2\text{O} \rightarrow \text{R-O-R} + 2\text{AgX}$

2 atoms of the alkyl group displace the silver from its oxide to form an ether as seen above. The two atoms of the alkyl group attach to both sides of the single oxygen atom.

4) Three 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 non-toxic emulsifying agents, plastics etc.