

Name: Ndubuisi Maxwell Chibueze

Department: Electrical/Electronics Engineering

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CHEM 102 Assignment on Ethers

1) Give the IUPAC Names of the following organic compounds:

Answers

CH_3OCH_3 — Methoxymethane

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

$(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ — Dibutoxymethane

$\text{CH}_3\text{CH}_2\text{OCH}_3$ — Methoxyethane

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ — Ethoxypropane.

2) Discuss the properties of ethers.

a) Physical States: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

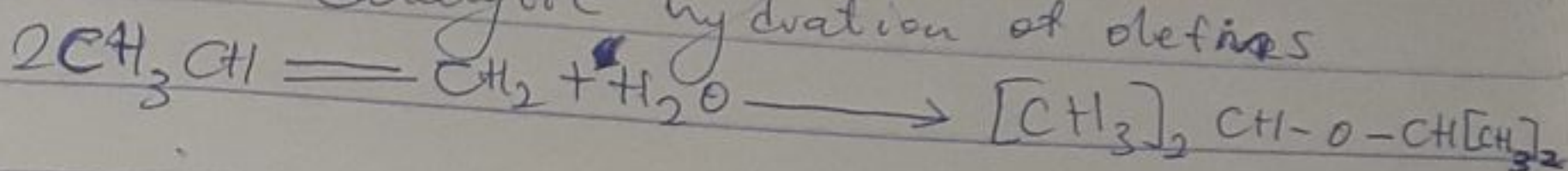
b) Density: Most of the simple ethers are less dense than water, although the density increases ~~with~~ with increasing relative molecular mass and some of the ~~gas~~ aromatic ethers are in fact denser than water.

c) Solubility: Ethers are less soluble in water than they are in corresponding alcohols. Lower molecular weight ethers such as methoxy methane and methoxy ethane are easily soluble in water since the molecules are able to form hydrogen bonds with the water molecules but as the hydrocarbon content of the molecules increases, there is a rapid decline in solubility.

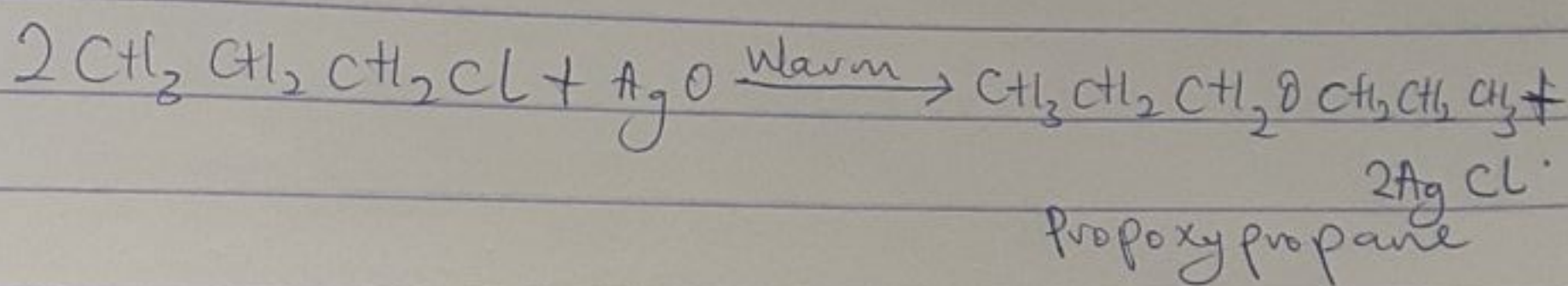
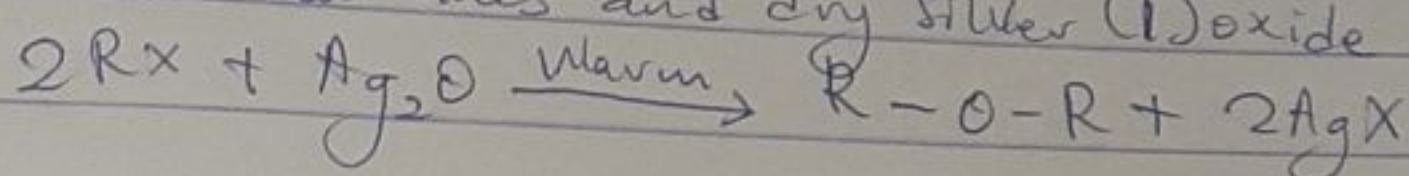
d) Reactivity: Ethers are inert at moderate temperatures their inertness at moderate temperatures leads to their wide use as reaction media.

2) Boiling point: Low molecular mass ethers have a lower boiling point than the corresponding alcohol but those ethers containing alkyl radicals larger than four carbon atoms the reverse is true. The boiling point of ethers tend to approximate those of hydrocarbons of same relative molecular mass from what it can be concluded that the molecules are not associated in the liquid phase as there are no suitable available hydrogen for association through hydrogen bonds.

3i) Controlled catalytic hydration of olefins



ii) From Haloalkanes and dry silver (I) oxide



4a) Ethylene oxide is used as a gaseous sterilizing agent.

b) Ethylene oxide is used in the preparation of nonionic emulsifying agents like plastic, synthetic textiles and plasticizers.

c) Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol.