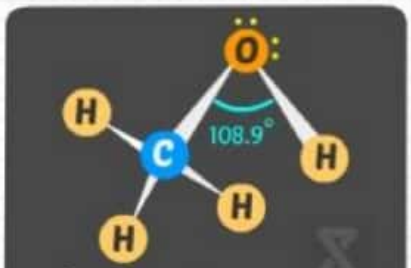
Part I

ALCOHOLS

BOILING POINT

Existence of Intermolecular Hydrogen bonding results in higher boiling point than hydrocarbons.



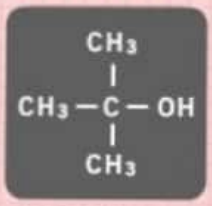
Oxygen acts as nucleophile due to the presence of lone pairs

SOLUBILITY

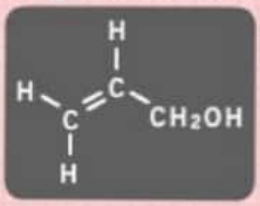
Alcohols are soluble in water, due to the presence of Hydrogen Bonds.

NOMENCLATURE

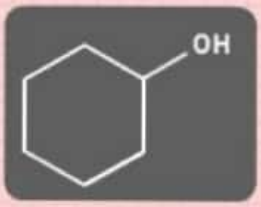
- Name the longest carbon chain that contains the carbon atom bearing the –OH group. Drop the final -e from the alkane name, and add the suffix -ol.
- Number the longest carbon chain starting at the end nearest the –OH group, and use the appropriate number, if necessary, to indicate the position of the –OH group.
- Name the substituents, and give their numbers as for an alkane or alkene.



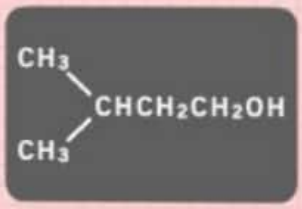
IUPAC Name
2-methyl-2-propanol
Common Name
t - butyl alcohol



IUPAC Name
2-propen-1-ol
Common Name:
Allyl alcohol



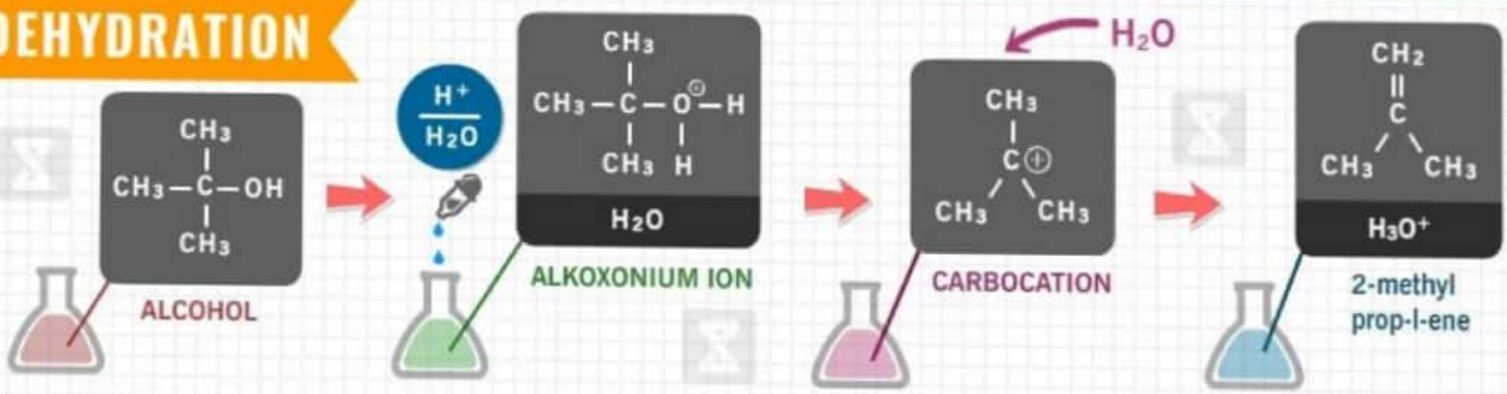
IUPAC Name
Cyclohexanol
Common Name
Cyclohexanol alcohol



IUPAC Name
3-methyl-1-butanol
Common Name
Isoamyl alcohol

CHEMICAL REACTIVITY

DEHYDRATION



Formation of carbocation is RDS here. So always try to make a stable carbocation by rearrangement.

HOW TO PREPARE ALCOHOL ?

Part II

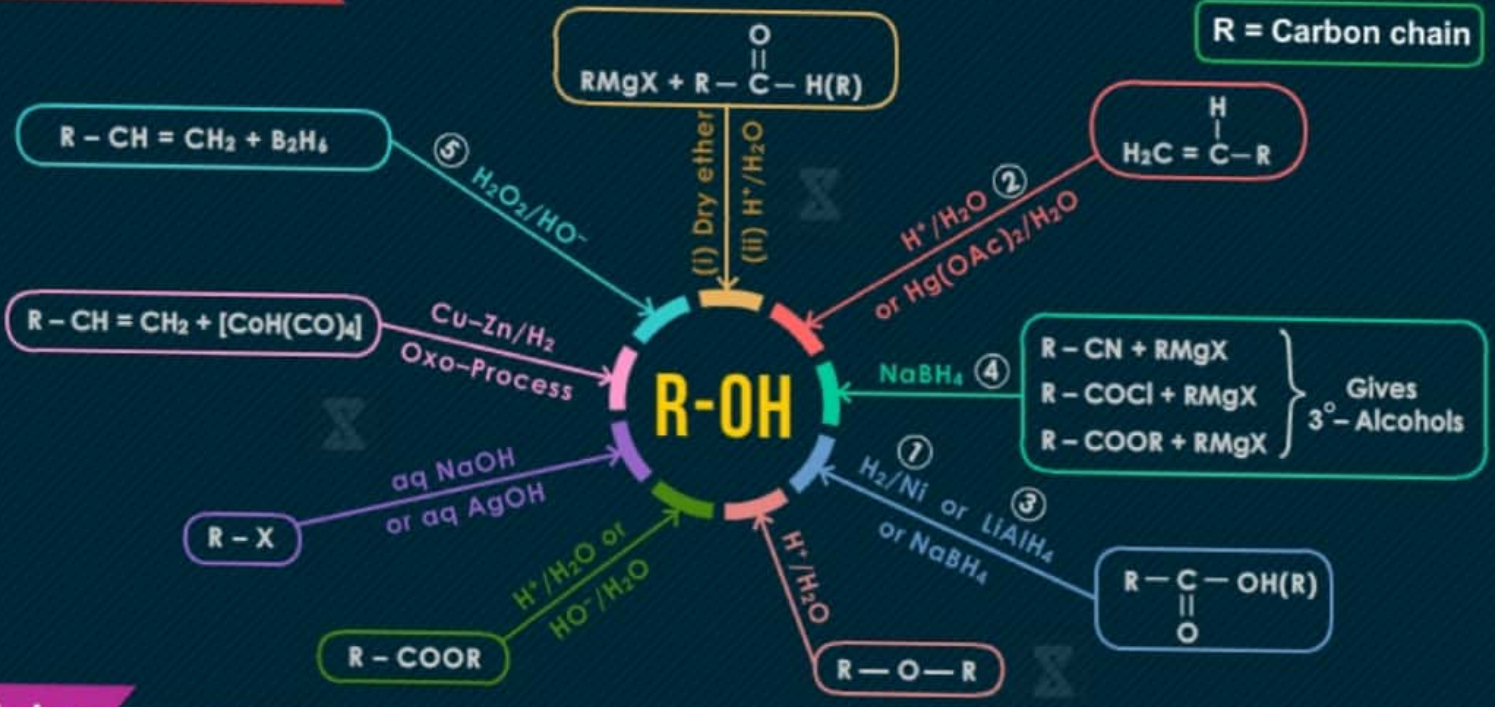
YOU NEED TO HAVE SOME **BASIC INFORMATION**

HIERARCHY OF OXIDATION

CH_4 (Lowest oxidation State) $\xrightarrow{[O]}$ CH_3OH (Alcohol) $\xrightarrow{[O]}$ $CH_3-C(=O)-H$ (Aldehydes / ketones) $\xrightarrow{[O]}$ $CH_3-C(=O)-OH$ (Carboxylic Acid) $\xrightarrow{[O]}$ CO_2 (Highest oxidation State)

WAYS TO DO IT

R = Carbon chain



Notes

1. H_2/Ni reduces all reducible groups including olefinic bonds.
2. Reaction proceeds via carbocation, rearrangement may accompany.
3. $LiAlH_4$ does not reduce olefinic bonds.
4. Avoid rearrangement.
5. Anti-Markownikoff's hydration takes place.

CATALYTIC HYDROGENATION

(Aldehyde) $R-C(=O)-H \xrightarrow[Pt]{H_2} RCH_2OH$ (1° Alcohol) + $H:^-$ (Hydride)

(Ketone) $R-C(=O)-R \xrightarrow[Pt]{H_2} RCH_2OH$ (2° Alcohol) + $H:^-$ (Hydride)

ETHERS

Ethers are a class of organic compounds that contain an oxygen between two alkyl or aryl groups. They have the formula **R-O-R'**, where **R and R'** are alkyl groups. These compounds are used in **dye, perfumes, oils, waxes** and **industrial use.** Ethers are named as **alkoxyalkanes.**

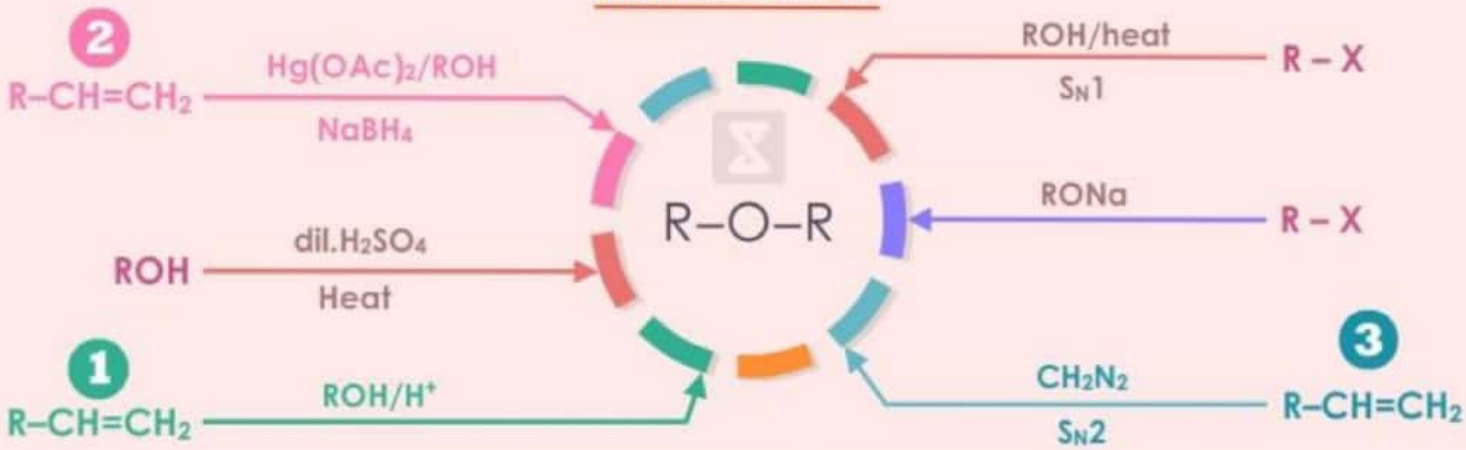
NOMENCLATURE OF ETHERS

Ethers are compounds having two alkyl or aryl groups bonded to an oxygen atom, as in the formula $R_1 - O - R_2$. The ether functional group does not have a characteristic **IUPAC** nomenclature suffix, so it is necessary to designate it as a substituent. To do so the common alkoxy substituents are given names derived from their alkyl component **(below):**

ALKYL GROUP	NAME	ALKOXY GROUP	NAME
CH_3^-	Methyl	CH_3O^-	Methoxy
$CH_3CH_2^-$	Ethyl	$CH_3CH_2O^-$	Ethoxy
$(CH_3)_2CH^-$	Isopropyl	$(CH_3)_2CHO^-$	Isopropoxy
$(CH_3)_3C^-$	Tert-Butyl	$(CH_3)_3CO^-$	Tert-Butoxy
$C_6H_5^-$	Phenyl	$C_6H_5O^-$	Phenoxy

Ethers can be named by naming each of the two carbon groups as a separate word followed by a space and the word ether. The **-OR** group can also be named as a substituent using the group name, alkoxy.

PREPARATION



1. Procees via carbocation intermediate, rearrangement may take place.
2. Do not procees via carbocation intermediate, rearrangement is avoided.
3. Gives methyl ether **($RCH_2CH_2OCH_3$)**