

MEPANDIK SAMUEL OSULLIABASI
GENERAL CHEMISTRY II
CHM 102
ATKINSONAL ENGLIACERINA
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Discuss the two major classification of Alcohols. Give two Examples Each for each class

Alcohols are a member of organic compounds consist of Carbon, hydrogen and OH atom. They are divided into classes:

PRIMARY ALCOHOL

This type of alcohol has three hydrogen atom attached to the carbon atom with the hydroxyl group. Methanol CH_3OH , Ethanol CH_3CH_2OH . It is denoted by (1°)

SECONDARY ALCOHOL

This type of alcohol has just one hydrogen atom attached to the carbon atom bearing the OH group. Examples: $CH_3CH(OH)CH_3$, Butan-2-ol. It is denoted by (2°)

TERTIARY ALCOHOL

This type of alcohol has no hydrogen atom attached to the carbon containing the OH group. Example Methylpropan-2-ol $(CH_3)_3C-OH$, Methyl pen-4-ol $CH_3CH_2CH_2C(OH)(CH_3)CH_3$. It is denoted by (3°)

SECOND CLASSIFICATION BASED ON THE NUMBER OF OH GROUP

MONOHYDRIC ALCOHOL

They have just one OH group present in their alcohol structure. Example Methanol, Ethanol, CH_3OH , CH_3CH_2OH etc.

DIBASIC ALCOHOL

This type of alcohol have two OH groups present in their alcohol structure. They are also called glycols.

Examples of dibasic alcohol are Ethane-1,2-diol $\text{OHCH}_2\text{CH}_2\text{OH}$,
Decane-2,8-diol $\text{CH}_3\text{CH}_2(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

TRIBASIC ALCOHOL

This type has three OH groups present in it alcohol structure.

Examples of tribasic are Butane-2,3,4-triol $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2\text{OH}$
Hexane-2,4,5-triol $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{OH}$

POLYBASIC ALCOHOL

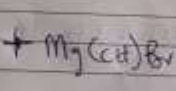
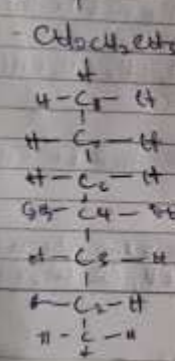
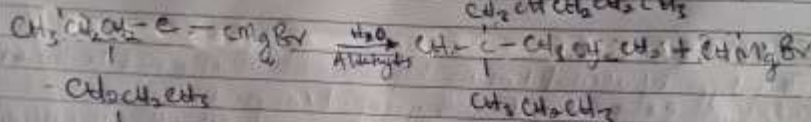
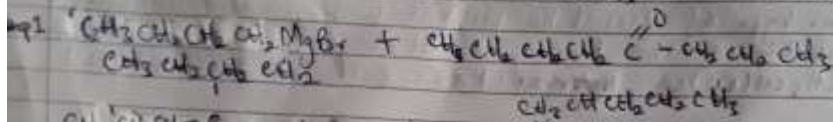
This type of alcohol has more than three OH groups in one alcohol structural formula. Example

Decane-3,5,9-triol $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
Pentane-2,3,4-triol $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2\text{OH}$

MEPANDIOK SAMUEL OSUWABASI
CHEM 102 GENERAL CHEMISTRY II
DR. JOHNSON
AERONAUTICAL ENGINEERING
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2. Discuss the solubility of alcohols in water, organic solvents
Lower alcohols with up to three carbon atoms in their molecules
are soluble in water because these lower alcohols can form
hydrogen bond with water molecules. The water solubility
of alcohols decreases with increasing relative molecular mass.
All monohydric alcohols are soluble in organic solvents. The
solubility of simple alcohols and polyhydric alcohols is
largely due to their ability to form hydrogen bonds with water
molecules.

Q. In the Grignard synthesis of 4-chloro-1-octane, react a named Grignard reagent with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}(=\text{O})\text{CH}_2\text{CH}_2\text{CH}_3$. Show the reaction steps.



4-propyl-octan-4-ol is the product from butyl magnesium bromide. The named Grignard reagent is butylmagnesium bromide. Once it reacts with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}(=\text{O})\text{CH}_2\text{CH}_2\text{CH}_3$ it gives 4-propyloctan-4-ol.