4U Chemistry:
Notes, Drawings, Examples

Alexandru Stan

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Units

1 Alcohol and Ethers

An alcohol group is an organic compound that contains the hydroxyl $-OH$ functional group the "alcohol" in beer and w ine is really "ethanol"

Some Important Alcohols:

- Methanl - prodiced from wood, often used a solvent but is toxic
- Isopropanol (propan-2-yl) - Rubbing alcohol, used as an antiseptic
- Glycerol - Used to make fats in the body. (propan-1,2,3-ol)

1.1 Naming Alcohols

When naming alcohol, the following rules need to be followed in this exact order:

1. Identify the longest chain of C that contains the $-OH$ (hydroxyl) group
2. Number the C atoms with the #1 closest to the $-OH$. It has prority over the alkyl groups and halogens
3. Drop the -e ending (if two vowels are present) on alkane and add -ol. Use a number if needed before the -ol
4. Name any side branches

1.1.1 Aromatic Alcohols

The simples aromatic alcohol is a benzene ring with one hydroxyl group group bondede to it. Its IUPAC name is phenol

If the benzene ring has two $-OH$ groups attached, the name is based on benzene and inlcudes numbers for the $-OH$ groups

1.2 Primary, Secondary, and Tertiary Alchols

Alcohols are classified acording to where the $-OH$ is attached. They are classified as primary, secondary, and tertiary alchols as stated below:

- 1° (Primary Alcohol) - Hydroxyl group attached to the end
- 2° (Secondary Alcohol) - Hydroxyl group attached to a C that is attached to two other C
- 3° (Tertiary Alchol) - Hydroxyl group attached to a C that is attached to three other C

1.3 Polyalcohols

Polyalcohols are just alcohols with more than one hydroxyl. For Nomencalture, use suffixes (di, tri, etc.) and numbers. The -e is kept if it followed by a consonant but is dropped if followed by a vowel

1.4 Properties of Alcohols

The presence of $-OH$ group makes the molecule polar that can form hydrogen bonds. The longer the Carbon (C) the less polar it is. Small alcohols are completely soluble in water, but the solubility decreases as the length of the carbon chain increases.

$\longleftrightarrow$

1.4.1 BP and MP

Alcohols can hydrogen bond and have higer MP and BP than hydrocarbons of similar sizes

Molecule	Molar Mass	Boiling Point
Propane	44 g/mol	$-42.1°C$
Ethanol	46 g/mol	$78.3°C$

1.5 Ethers

In an ether, the functional group consists of two C atoms connected to a single O atom. The $C-O$ bond is polar and the shape is bent, making it a polar molecule. Ethers are also known to be good solvents