

4U Chemistry:

Notes, Drawings, Examples

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1 Alcohol and Ethers

An alcohol group is an organic compound that contains the hydroxyl —OH functional group. The “alcohol” in beer and wine is really “ethanol”

Some Important Alcohols:

- Methanol - produced from wood, often used as 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 priority 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 simplest aromatic alcohol is a benzene ring with one hydroxyl group bonded to it. Its IUPAC name is phenol

If the benzene ring has two —OH groups attached, the name is based on benzene and includes numbers for the —OH groups

1.2 Primary, Secondary, and Tertiary Alcohols

Alcohols are classified according to where the —OH is attached. They are classified as primary, secondary, and tertiary alcohols as stated below:

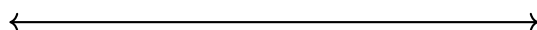
- 1° (Primary Alcohol) - Hydroxyl group attached to the end
- 2° (Secondary Alcohol) - Hydroxyl group attached to a C that is attached to two other C
- 3° (Tertiary Alcohol) - Hydroxyl group attached to a C that is attached to three other C

1.3 Polyalcohols

Polyalcohols are just alcohols with more than one hydroxyl. For Nomenclature, 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.



1.4.1 BP and MP

Alcohols can hydrogen bond and have higher 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

