

the same -OH group behaves differently on a chain than on a ring, and an ether just hides the OH between two carbons

Alcohol vs Phenol vs Ether *

Alcohol

- OH on an sp^3 carbon: 1°, 2°, 3° by carbons that carbon touches
- OH on an sp^2 carbon of a $C=C$ is a **vinyl alcohol**, not classed 1/2/3°

Phenol

- OH directly on an aromatic ring carbon
- OH on an sp^3 carbon attached to the ring is **aromatic alcohol**, benzylic, not phenol

Ether

- O bonded to two alkyl and/or aryl groups, $R-O-R'$, $Ar-O-R$, $Ar-O-Ar'$
- symmetrical** if both groups match, **unsymmetrical (mixed)** if they differ

mono/di/tri/polyhydric alcohols and phenols are classed by how many -OH groups they carry, e.g. ethylene glycol is dihydric, glycerol is trihydric

Three Ways to Name an Alcohol

- common/trivial**: alkyl group name + word 'alcohol', e.g. isopropyl alcohol, tert-butyl alcohol
- carbinol system**: alcohols as substituted methyl alcohol (carbinol), groups named alphabetically first
- IUPAC**: alkane's -e becomes -ol, lowest locant to -OH
- polyhydric alcohols keep the -e and add di-/tri-ol with locants: ethane-1,2-diol, propane-1,2,3-triol

Naming Phenols and Ethers

- phenol's IUPAC name is benzenol, though 'phenol' itself is IUPAC-accepted
- substituted phenols use o-/m-/p- or locants 2-/3-/4-: catechol is 1,2-diol, resorcinol 1,3-diol, hydroquinone 1,4-diol
- common ether names: alkyl names alphabetically + 'ether' (di- if both match), e.g. ethyl methyl ether
- IUPAC ether names: alkoxyalkane. LARGER group is the parent, smaller becomes alkoxy-, e.g. 2-methoxypropane