

Classify by Functional Group

The structural taxonomy of Alcohols, Phenols, and Ethers.

Alcohol (Aliphatic)



Phenol (Aromatic)

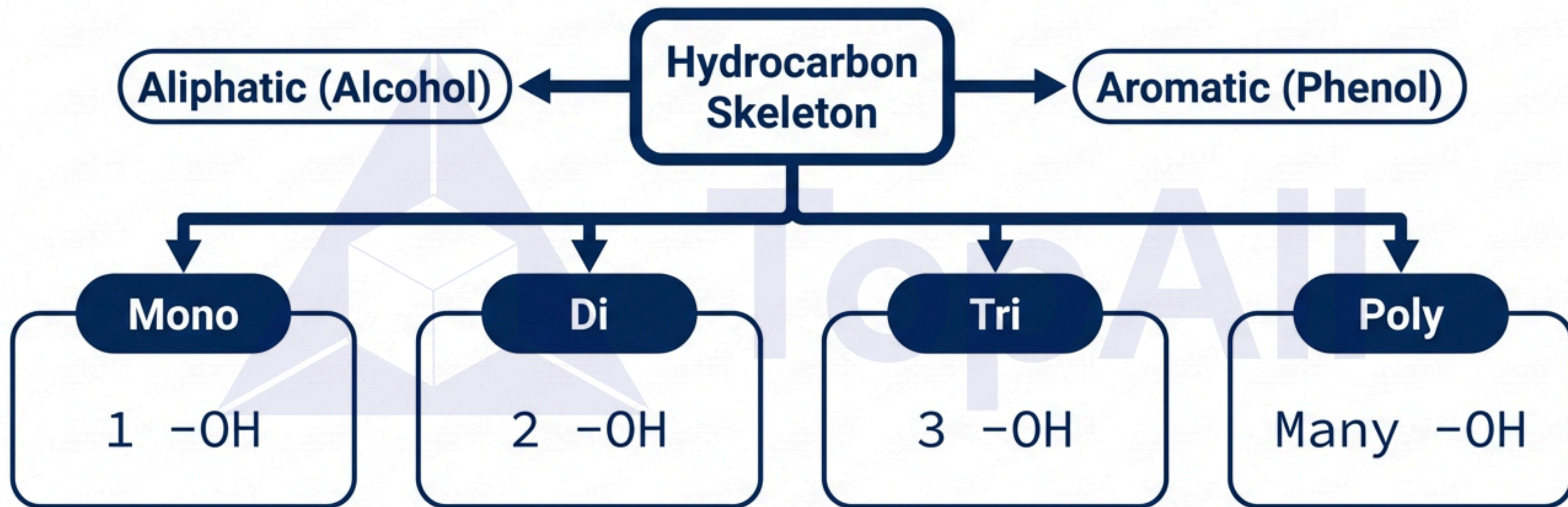


Ether (Alkoxy/Aryloxy)



The Primary Sorting Rule

Classifying by the number of hydroxyl (-OH) groups attached to the skeleton.



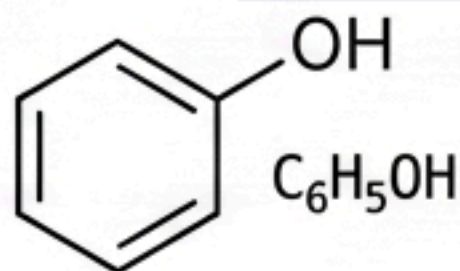
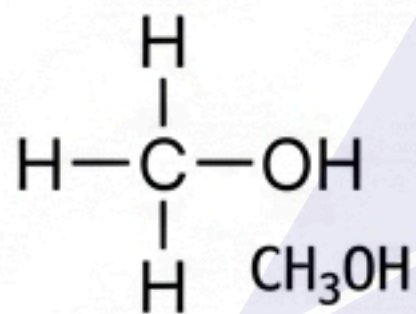
The nature of the carbon skeleton (aliphatic vs. aromatic) determines whether it is an alcohol or a phenol, but the counting rule applies equally to both.

Structural Complexity by -OH Count

Applying the counting rule to chemical structures.

1 -OH

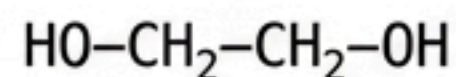
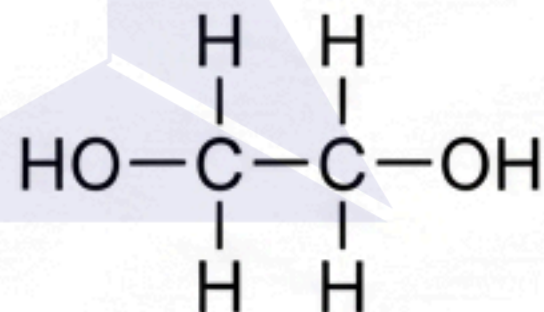
Monohydric



Methanol ingestion is highly poisonous.

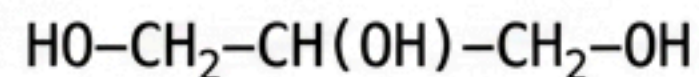
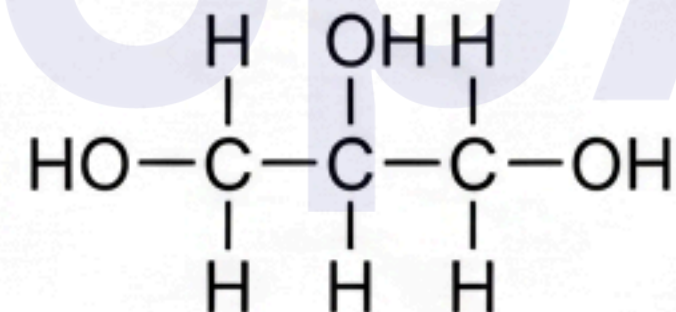
2 -OH

Dihydric



3 -OH

Trihydric



Many -OH

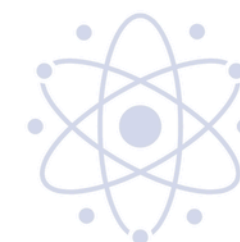
Polyhydric

Complex carbohydrates
(e.g., Sorbitol).



You've Learned the Theory. Let's Test Them Now.

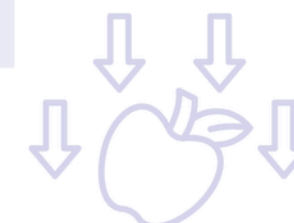
$$E=mc^2$$



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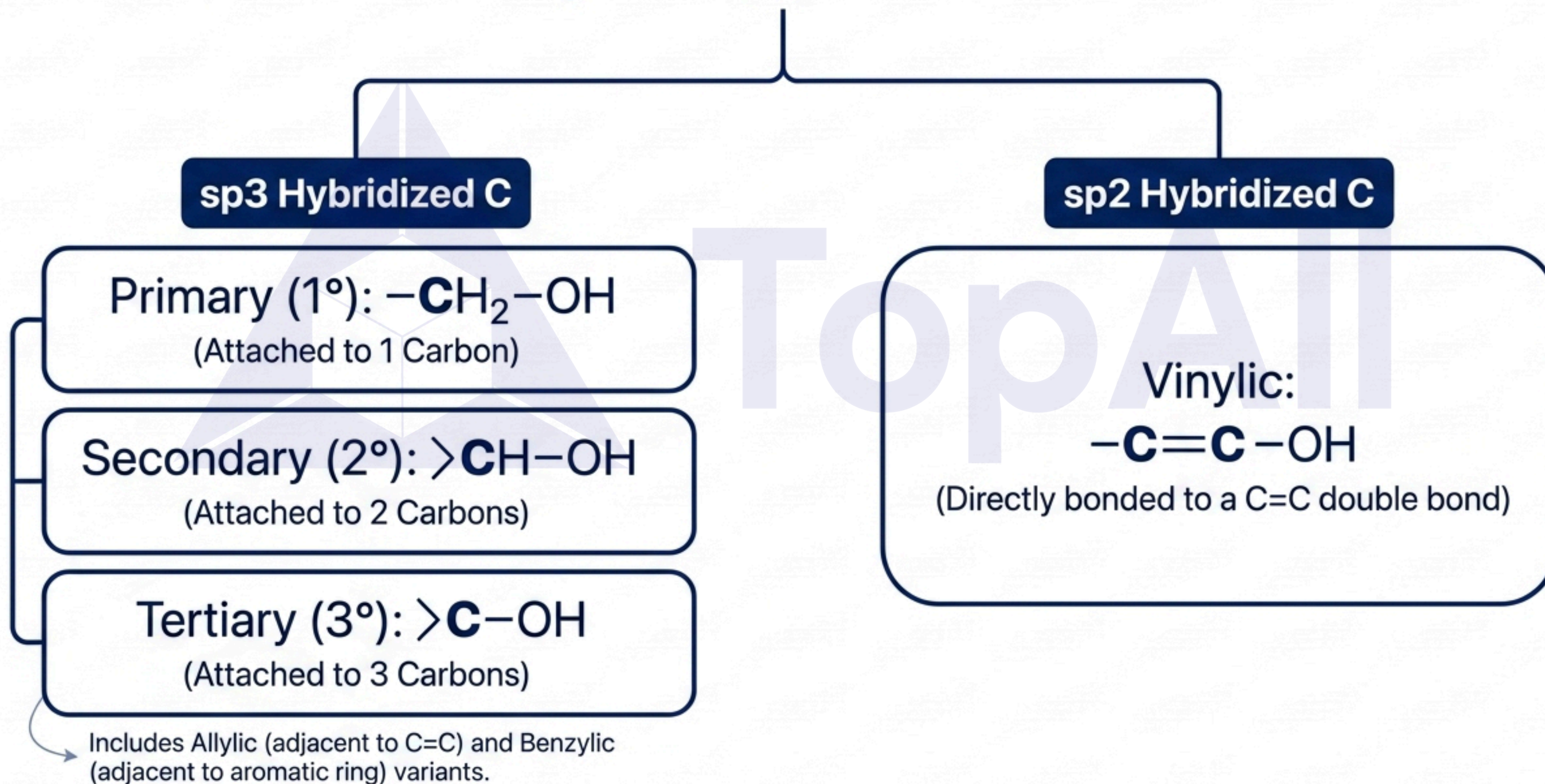


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Diagnosing Monohydric Alcohols

Classification based on the hybridization of the C–OH bond.



Phenols: The Aromatic Anchor

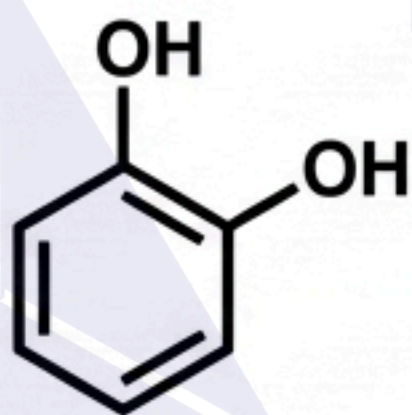
Hydroxyl groups directly attached to an sp^2 hybridized aromatic ring.

Monohydric

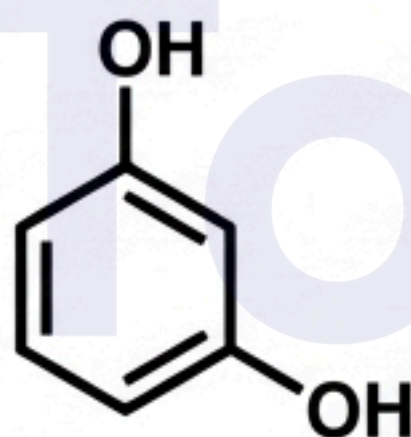


Substituted derivatives use ortho (1,2-), meta (1,3-), and para (1,4-) nomenclature.

Dihydric



Catechol
(1,2-benzenediol)

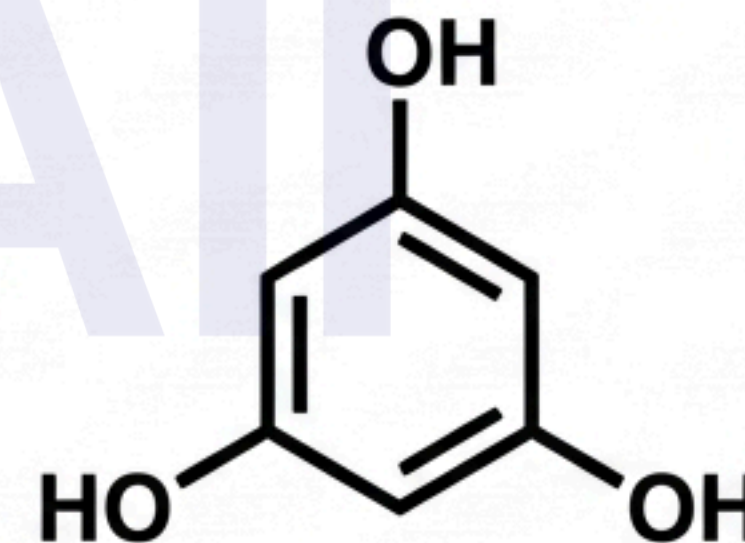


Resorcinol
(1,3-benzenediol)



Hydroquinone
(1,4-benzenediol)

Trihydric



Phloroglucinol

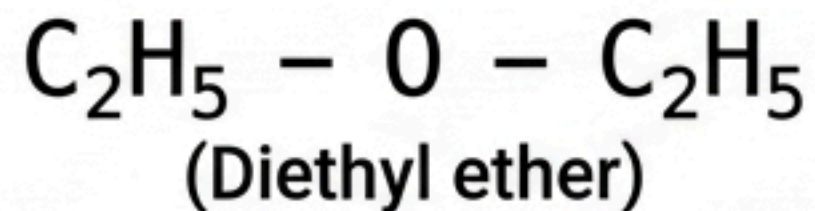
Ethers: Sorting by Symmetry

Ethers are classified based on the alkyl or aryl groups attached to the central oxygen.

Simple / Symmetrical



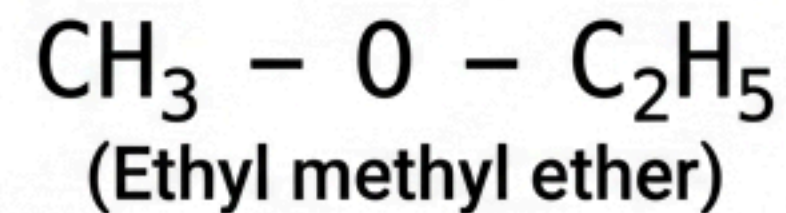
(Identical groups on both sides).



Mixed / Unsymmetrical



(Different groups).



Why Classification Matters

Structure dictates nomenclature, properties, and reactivity.

The systematic classification of alcohols, phenols, and ethers is not just for naming—it is the predictive framework for their physical properties and chemical behavior.

Nomenclature

Drives IUPAC suffix rules (e.g., -ol, diol).

Properties

Determines boiling points and water solubility (e.g., extent of intermolecular H-bonding scales with -OH count).

Reactivity

Predicts reaction mechanisms (e.g., 1° vs 3° alcohols in the Lucas Test; C-O bond cleavage in ethers).



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