

The Functional Group Idea

The chemical 'driver' of an organic molecule.

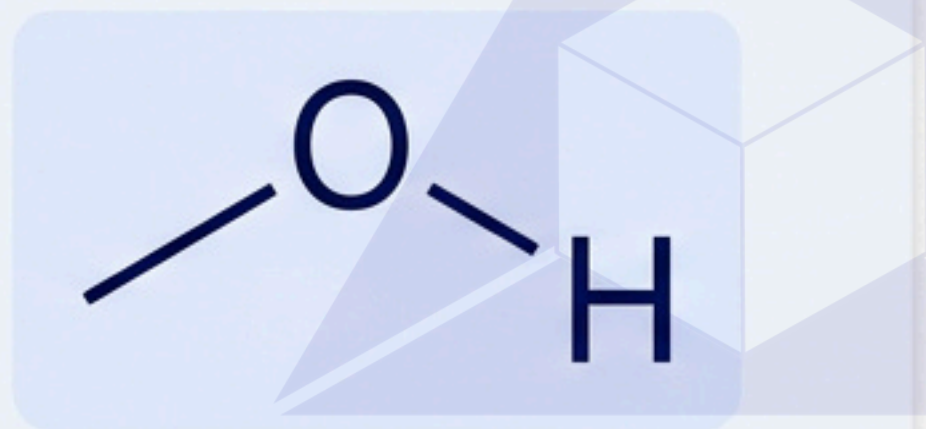


An atom, or a group of atoms joined in a specific manner which is responsible for the characteristic chemical properties of the organic compounds.

Class: Alcohols

The Hydroxyl Group (-OH)

Structure Schematic



Oxygen is sp^3 hybridized, resulting in a bent molecular shape.

IUPAC Nomenclature

Suffix: -ol

Drop the terminal 'e' from the parent alkane and add 'ol'.

(Alkane $\rightarrow$ Alkanol)

Real-World Example



Ethanol

(Ethane - e + ol)



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$$E=mc^2$$



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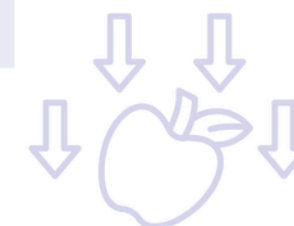
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Key Highlights

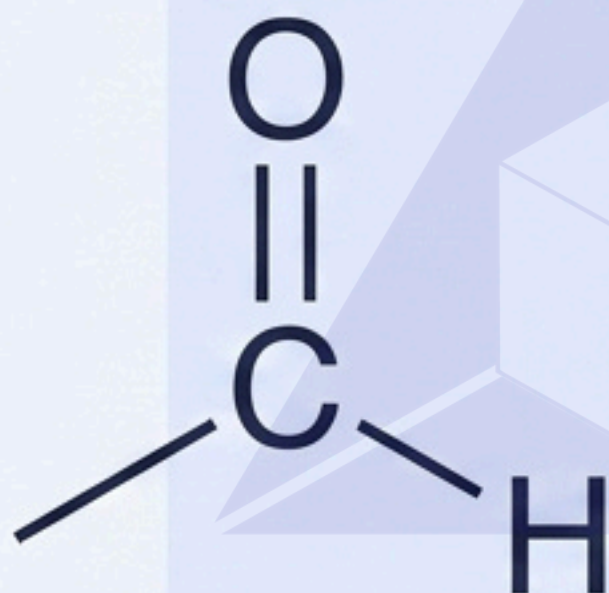
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Class: Aldehydes

The Formyl / Aldehyde Group ($-\text{CHO}$)

Structure Schematic



Always occurs at the terminal end of a carbon chain.

IUPAC Nomenclature

Suffix: **-al**

Header

The carbon atom of the $-\text{CHO}$ group is ALWAYS counted as C-1 in the principal parent chain.

Real-World Example



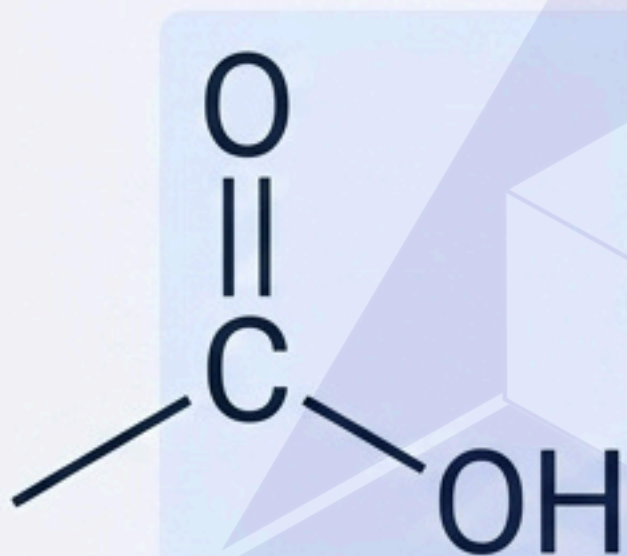
Ethanal

(Ethane - e + al)

Class: Carboxylic Acids

The Carboxyl Group (–COOH)

Structure Schematic



Carboxyl = Carbonyl (C=O) + Hydroxyl (–OH). Holds top-tier priority in IUPAC nomenclature.

IUPAC Nomenclature

Suffix: -oic acid

Header

Like aldehydes, the carbon of the –COOH group is ALWAYS assigned as C-1 in the parent chain.

Real-World Example



Ethanoic Acid

Ethanoic Acid

(Commonly: Acetic Acid)

Revision Frame: The Chemistry Controller

The functional group defines the **Homologous Series**. The R-group changes size, but the chemistry remains identical.

Molecules containing the same functional group belong to the same **Homologous Series** and exhibit nearly identical chemical reactions, regardless of carbon chain length.

Alcohols

Formula: R-**OH**

Suffix: "-ol"

Series Examples:
Methanol, Ethanol,
Propanol

(all undergo similar
oxidation reactions)

Aldehydes

Formula: R-**CHO**

Suffix: "-al"

Series Examples:
Methanal, Ethanal,
Propanal

(all undergo similar
nucleophilic addition reactions)

Carboxylic Acids

Formula: R-**COOH**

Suffix: "-oic acid"

Series Examples:
Methanoic, Ethanoic,
Propanoic

(all exhibit similar
acidic properties)



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