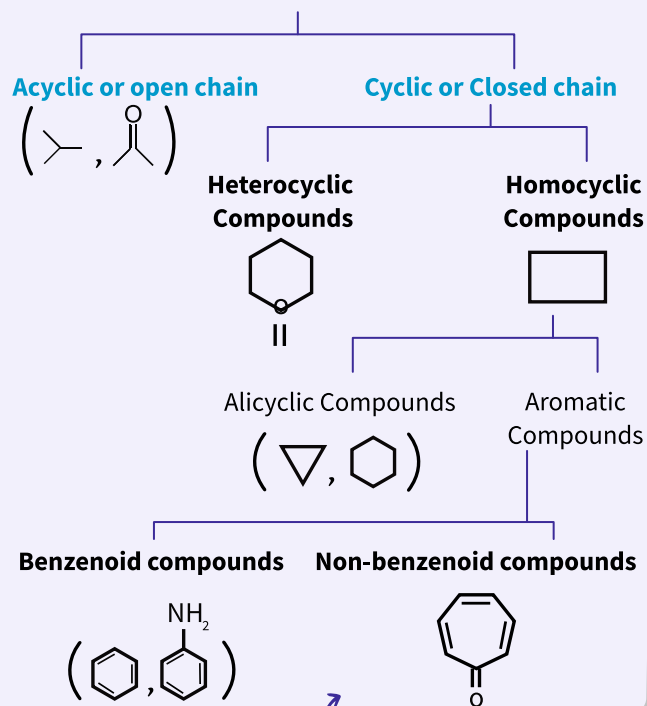


CLASSIFICATION OF ORGANIC COMPOUND



PARTS OF IUPAC NAME

- ✦ Prefix
- ✦ Root word
- ✦ Primary suffix
- ✦ Secondary Suffix

Rules for IUPAC Naming

Rule 1 : Select the longest possible carbon chain.

Rule 2 : Numbering of parent chain is done from that side where functional group, multiple bond and substituent get the lowest number.

Rule 3 : Lowest sum rule — If first substituent gets same number from all side then chain selected should have lowest sum of all substituent numbering.

Rule 4 : Alphabet rule — Naming should be done in alphabetical order if the numbering of all substituent is same.

Rule 5 : If the molecule has more than one functional group, the functional group with highest priority receives the lowest number.

9. ORGANIC CHEMISTRY: SOME BASIC PRINCIPLES AND TECHNIQUES

ISOMERISM

STRUCTURAL ISOMERISM

Compounds that have same chemical formula but different structural arrangement are called structural isomers.

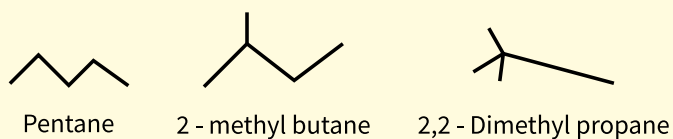
STEREO ISOMERISM

Compounds that have same chemical formula and sequence of covalent bonds but differ in spatial arrangement are called stereo isomers.

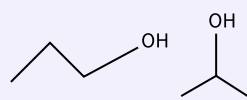
Optical Isomerism

Geometrical Isomerism

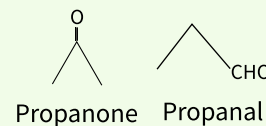
Chain Isomerism



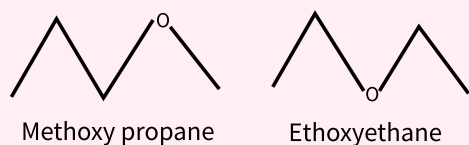
Position Isomerism



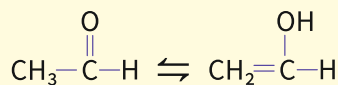
Functional Isomersim



Metamerism



Tautomerism



Bond Fission

- Homolytic free radicals are formed.
- Heterolytic Carbocation and carbanion is formed.

Organic Reaction Types

- Addition reaction
- Substitution reaction
- Elimination reaction

Attacking Reagent

Organic molecule \rightarrow Intermedite \rightarrow Products(s)

Carbocation

- Carbon atom having a positive charge with only six electron in its valence shell.
- Carbocation carbon is sp^2 hybridised.

Order of Stability: $-\overset{+}{C} > -\overset{+}{C}H > -\overset{+}{C}H_2 > \overset{+}{C}H_3$

Carbanion

- Carbon atom having a negative charge on it.
- Carbanion carbon is sp^3 hybridised.

$CH_3 > -CH_2 > -CH > -\overset{-}{C}$

Free Radical

- Carbon atom having odd electron in the valence shell is called carbon free radical.
- Carbon of free radical is sp^2 hybridised.

$-\dot{C} > -\dot{C}H > -\dot{C}H_2 > \dot{C}H_3$

Electrophile

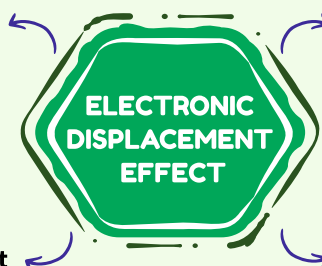
Electron deficient species. Lewis acid.
Example- Cl^+ , Br^+ , NO_2^+ , C^+H_3 , $AlCl_3$, etc.

Nucleophile

Electron rich species. Lewis base.
Example- $H_2\ddot{O}$, $\ddot{N}H_3$, OH^- , Cl^- , F^- , CH_3^-

Inductive Effect

- Partial displacement of sigma electrons towards more electronegative atom /Group.
- It is a permanent effect
 - +I Effect CH_3 , C_2H_5 , etc.
 - I Effect $-CN$, $-COOH$, etc.



Electromeric Effect

In the presence of reagent, the double or triple bonds get broken and it is a temporary effect.

Resonance Effect

When a molecule can be represented by two or more structures which have same arrangement of atoms but differ in distribution of electrons is called resonance.

Hyperconjugation Effect

Delocalisation of s electrons of C-H bond of an alkyl group directly attached to an atom with unshared p-orbital.

+R Effect
halogen, -OH, OR

-R effect
 $-COOH$, $-CHO$, $-CN$

QUALITATIVE ANALYSIS

Halogens

Sodium Extract is acidified with conc. HNO_3 and treated with silver nitrate.

Sulphur

Sodium Extract is acidified with acetic acid and lead acetate is added.

Nitrogen

Sodium extract is boiled with iron (II) sulphate, then acidified with conc. H_2SO_4

Phosphorous

Compound is treated with oxidising agent, then boiled with HNO_3 and ammonium molybdate.

Carbon & Hydrogen

by heating with copper (II) oxide

QUANTITATIVE ANALYSIS

Halogens (Carius method)

$$\% \text{halogen} = \frac{\text{at.mass of (x)} \times m_1 \times 100}{\text{molar mass of Ag} \times m}$$

m-Mass of org. Compound
 m_1 -mass of AgX formed

Sulphur Carius method

$$\%S = \frac{32 \times m_1 \times 100}{233 \times m}$$

m-Mass of org. Compound
 m_1 -mass of $BaSO_4$ formed

Nitrogen

Dumas method

$$\%N = \frac{28 \times V \times 100}{22400 \times m}$$

Kjeldahl's method

$$\%N = \frac{1.4 \times N \times V}{m}$$

m-Mass of org. Compound
N-Normality of acid
V-Volume of acid

Phosphorus

$$\%P = \frac{62 \times m_1 \times 100}{222 \times m}$$

m-Mass of org. Compound
 m_1 -mass of $Mg_2P_2O_7$ formed

Carbon and Hydrogen

$$\%C = \frac{12 \times m_2 \times 100}{44 \times m}$$

$$\%H = \frac{2 \times m_1 \times 100}{18 \times m}$$

m-Mass of org. Compound
 m_2 -mass of CO_2 produced
 m_1 -mass of H_2O produced