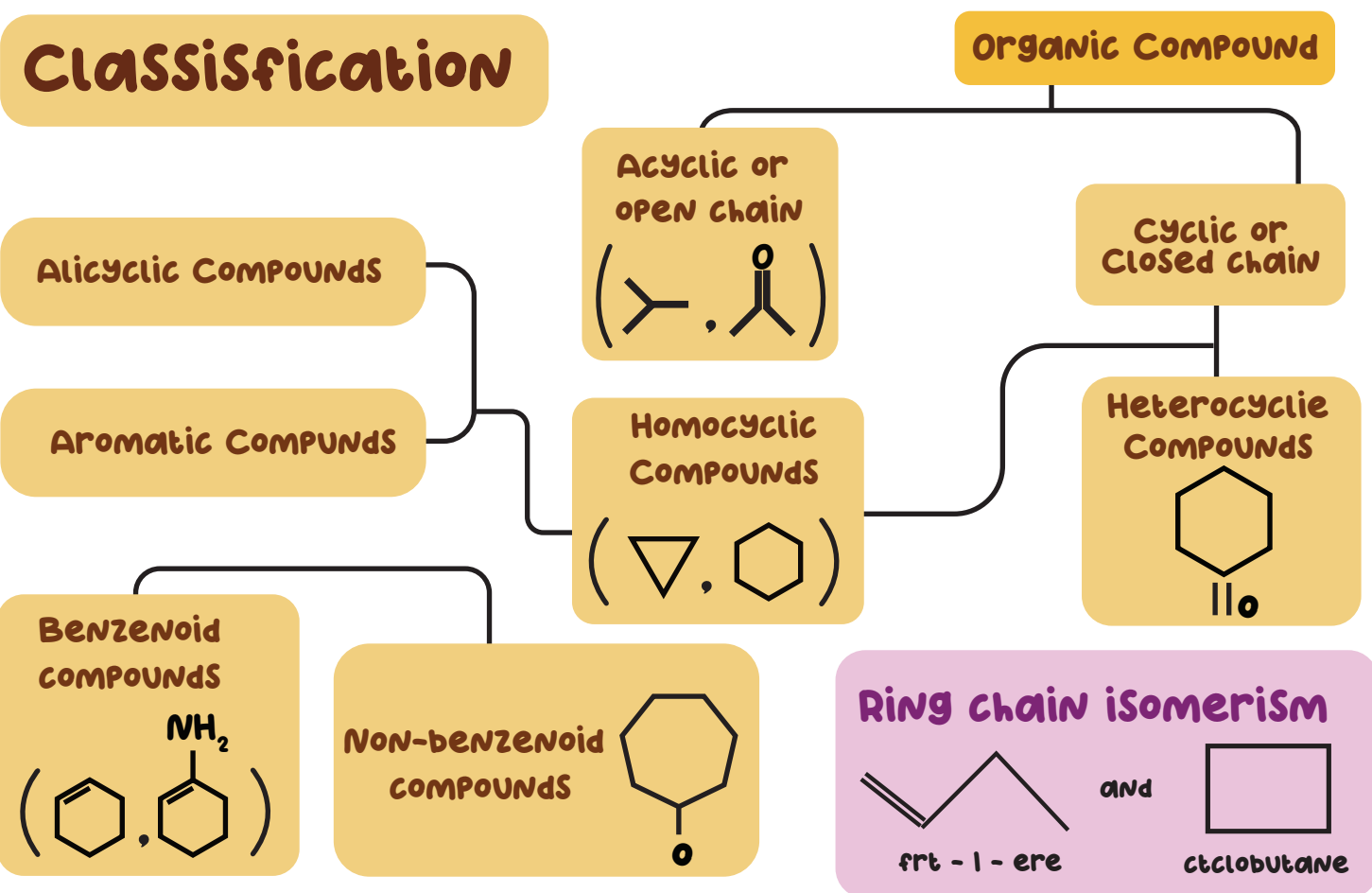
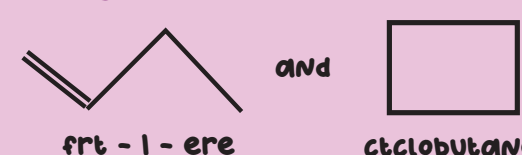


Classification



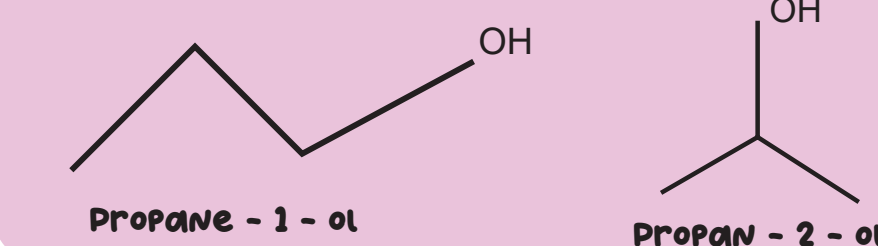
Ring chain isomerism



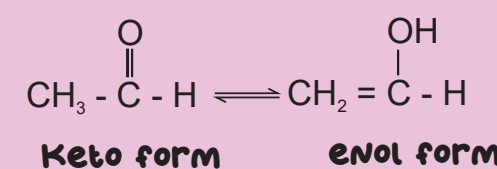
Structural Isomerism

Compounds that have the same chemical formula but different chemical bond arrangements are called structural isomers.

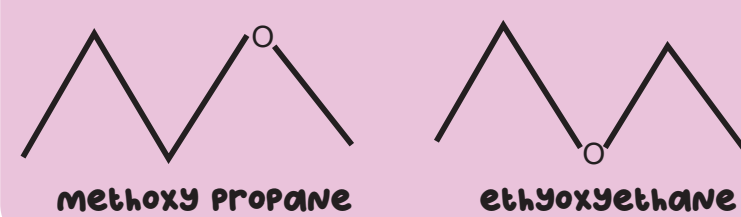
Position Isomerism



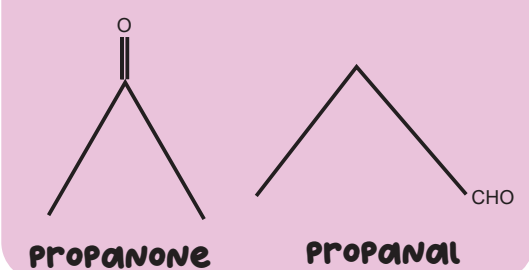
Tautomerism



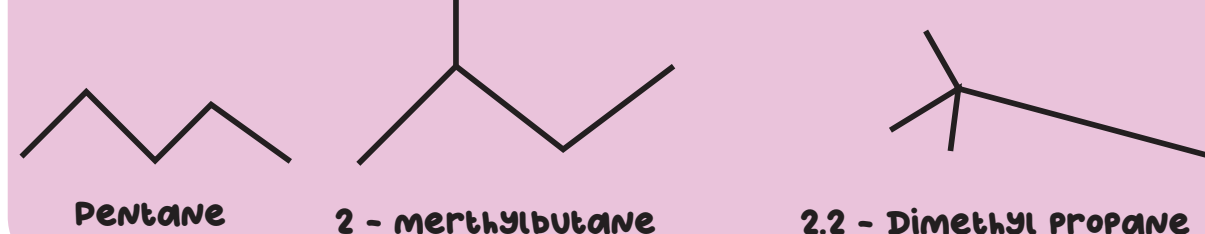
Metamerism



Functional Isomerism



Chain Isomerism



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 sides 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.

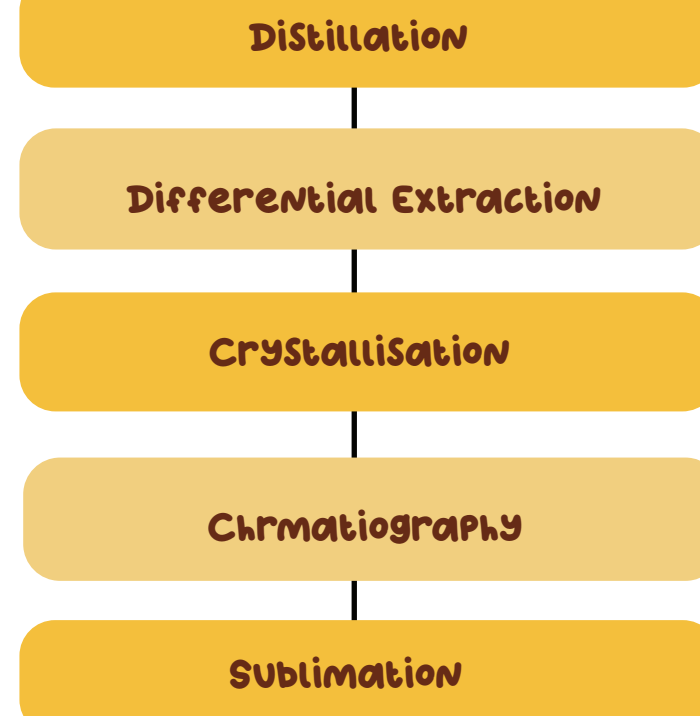
ISOMERISM

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

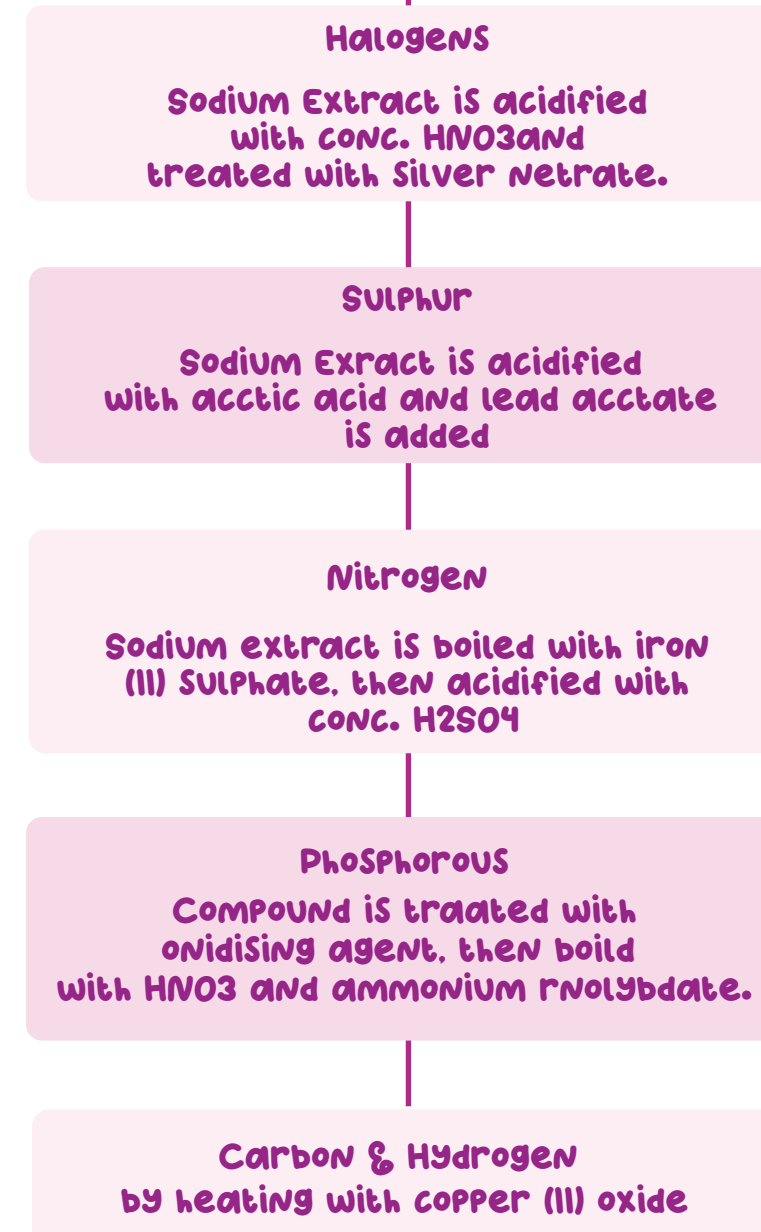
Geometrical Isomerism

Optical Isomerism

Purification Methods



Qualitative Analysis



Quantitative Analysis

Carbon and Hydrogen

$$\%C = \frac{12 \times m_2 \times 100}{44 \times m} \quad \%H = \frac{2 \times m_1 \times 100}{18 \times m}$$

m-Mass of org. Compound
M₁-Mass of CO₂ produced
M₁-Mass of H₂ produced

Nitrogen

Carius 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

Halogens

Carius method: $\% \text{halogen} = \frac{\text{at-mass of } \times M_1 \times 100}{\text{molar mass of Ag} \times m}$

m-Mass of org. Compound
M₁-Mass of AgX formed

Sulphur

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

m-Mass of org. Compound
M₁-Mass of BaSO₄ formed

Phosphorus

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

m-Mass of org. Compound
M₁-Mass of Mg₂P₂O₇ formed

Organic Reaction

Types

- Addition reaction
- Substitution reaction
- Elimination reaction

Bond Fission

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

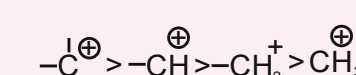
Electrophile
Electron deficient species.
Lewis acid
Example - Cl⁺, Br⁺, NO₂⁺, CH₃⁺, AlCl₃, etc.

Nucleophile
Electron rich species
Lewis base
Example - H₂O, NH₃, OH⁻, Cl⁻, F⁻, CH₃⁻.

Organic molecule $\xrightarrow{\text{Attacking Reagent}}$ Intermediate \rightarrow Product(s)

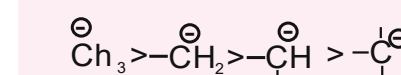
Carbocation

- Carbon atom having a positive charge with only six electrons in its valence shell.
- Carbocation carbon is sp² hybridised.



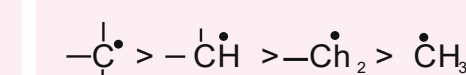
Carbanion

- Carbon atom having a negative charge on it.
- Carbanion carbon is sp³ hybridised.



Free Radical

- Carbon atom having 7 electrons in the valence shell is called carbon free radical.
- Carbon of free radical is sp² hybridised.



Organic Chemistry : Some Basic Principles and Techniques

Electromeric displacement Effect

Inductive Effect

Partial displacement of sigma electrons towards more electronegative atom/group. It is a permanent effect.

+I Effect
CH₃, C₂H₅, etc

-I Effect
-CN, -COOH, etc

Resonance Effect

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

+R Effect
halogen, -OH, OR

-R Effect
-COOH, -CHO, -CN

Hyperconjugation Effect

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

Electromeric Effect

In the presence of reagent, the double or triple bond gets broken. It is a temporary effect.