

Aliphatic Compounds

Straight or branched chain compounds

E.g. Ethane, Isobutane, Acetaldehyde, Ethanol, etc.

Aromatic Compounds

Commonly called 'arenes'. They have a ring system with planar structure and $(4n + 2) \pi$ electrons that are delocalised in the ring

E.g. Benzene, Naphthalene, Cyclopentadienyl anion, Toluene, etc.

Metamerism

Different alkyl chains on either side of the functional group of the molecule, e.g. methoxypropane ($\text{CH}_3\text{OC}_3\text{H}_7$) and ethoxyethane ($\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$)

Stereoisomerism

Difference in relative positions of atoms or groups in compounds with same constitution and sequence of covalent bonds

Geometrical and optical isomerism

Nucleophiles

Nucleus seeking reagent that donates an electron pair. They are negatively charged ions or neutral molecules with lone pair of electrons

E.g. hydroxide (HO^-), cyanide (NC^-) ions and carbanions (R_3C^-), H_2O , R_3N , R_2NH , etc.

Electrophiles

Electron seeking reagent that accepts an electron pair

E.g. carbocations, carbonyl group ($>\text{C}=\text{O}$) or alkyl halides, etc.

Inductive Effect

An ability of substituent(s) to either withdraw or donate electron density to the attached carbon atom

Electron withdrawing groups

- halogen, $-\text{NO}_2$, $-\text{CN}$, $-\text{COOH}$, $-\text{COOR}$, etc.

Electron donating groups - alkyl groups

Positive Resonance Effect (+R effect)

Transfer of electrons away from an atom or substituent group attached to the conjugated system

E.g. - halogen, $-\text{OH}$, $-\text{OR}$, $-\text{OCOR}$, $-\text{NH}_2$, $-\text{NHR}$, $-\text{NR}_2$, $-\text{NHCOR}$

Negative Resonance Effect (-R effect)

Transfer of electrons towards the atom or substituent group attached to the conjugated system

E.g. - COOH , $-\text{CHO}$, $>\text{C}=\text{O}$, $-\text{CN}$, $-\text{NO}_2$

Electromeric Effect (E effect)

Positive Electromeric Effect (+E effect) - The π -electrons of the multiple bond are transferred to the atom that gets attached to the reagent

Negative Electromeric Effect (-E effect) - The π -electrons of the multiple bond are transferred to the atom that does not get attached to the reagent