

Hydrocarbons

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 5. **Aromatic Hydrocarbon**
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Hydrocarbons are the compounds of carbon and hydrogen only. Hydrocarbons are mainly obtained from coal and petroleum, which are the major sources of energy.

Petrochemicals are the prominent starting materials used for the manufacture of a large number of commercially important products. LPG (liquefied petroleum gas) and CNG (compressed natural gas), the main sources of energy for domestic fuels and the automobile industry, are obtained from petroleum. Hydrocarbons are classified as open chain saturated (alkanes) and unsaturated (alkenes and alkynes), cyclic (alicyclic) and aromatic, according to their structure.

Alkanes

- The important reactions of alkanes are free radical substitution, combustion, oxidation and aromatization.
- Alkanes show conformational isomerism due to free rotation along the C–C sigma bonds. Out of staggered and the eclipsed conformations of ethane, staggered conformation is more stable as hydrogen atoms are farthest apart.

Alkenes and alkynes

- Alkenes and alkynes undergo addition reactions, which are mainly electrophilic additions.
- Alkenes exhibit geometrical(cis-trans) isomerism due to restricted rotation around the carbon–carbon double bond.

Aromatic hydrocarbons

Aromatic hydrocarbons, despite having unsaturation, undergo mainly electrophilic substitution reactions. These undergo addition reactions only under special conditions.

Benzene and benzenoid compounds show aromatic character. Aromaticity, the property of being aromatic is possessed by compounds having specific electronic structure characterised by Hückel $(4n+2)\pi$ electron rule. The nature of groups or substituents attached to benzene ring is responsible for activation or deactivation of the benzene ring towards further electrophilic substitution and also for orientation of the incoming group. Some of the polynuclear hydrocarbons having fused benzene ring system have carcinogenic property.