

Organic Chemistry: Benzene and its Derivatives

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Editorial Note

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EDITORIAL

The organic chemical compound benzene, commonly known as benzol, has the formula C_6H_6 . PhH is a common abbreviation. Benzene is a colourless, flammable liquid with a pleasant odour and a high melting point. It is carcinogenic, and its usage as a gasoline additive is now restricted, but it is a vital industrial solvent and precursor in the manufacture of medicines, plastics, synthetic rubber and colours. Benzene is a naturally occurring component of crude oil, although it is generally manufactured from other petroleum molecules.

In organic chemistry, benzene is a crucial molecule. It is made up of six carbon atoms arranged in a ring, each with a hydrogen atom linked to it; by substituting one or more of the hydrogens with a functional group, a wide range of compounds may be created. This diagram depicts a few of the most frequent simple derivatives that may be generated this way.

The term "aromatic compounds" refers to compounds that have benzene rings in their structures. The name "fragrance" comes from the fact that they typically have a pleasant and sweet scent, although the contemporary definition of the term refers to the structure of molecules. Simply put, it refers to conjugated cyclic configurations of bound carbons that are linked by alternating double and single bonds. While the requirements for a chemical to be classified as aromatic are a little more sophisticated than this, it is a useful and straightforward definition.

By substituting one or more hydrogen atoms with another functional group, benzene may be converted into a variety of useful chemical compounds. Phenol, toluene and aniline, with chemical formulas of PhOH, PhMe and PhNH₂, are examples of simple benzene derivatives. Biphenyl, $C_6H_5-C_6H_5$, is formed by joining benzene rings. Fused aromatic hydrocarbons such as naphthalene and anthracene result from further hydrogen loss. The hydrogen-free allotrope of carbon, graphite, is the fusion process's limit. Nitrogen is present in the most significant variants. The chemical pyridine, C_5H_5N , is made by replacing one CH with N. Despite the structural similarities between benzene and pyridine, benzene cannot be transformed to pyridine. Depending on where the second CH bond is replaced with N, the result is pyridazine, pyrimidine, or pyrazine.

The aromatic electron cloud above and below the hexagonal plane of the carbon atom ring is represented by the ring in the structure of benzene, which has the chemical formula C_6H_6 . Aromatic compounds are widely utilised in organic chemistry and in the production of a variety of chemical compounds.

The carcinogenic chemical benzene is well-known. This does not, however, simply mean that substances with a benzene ring in their structure are likewise carcinogenic. It's a frequent misperception that the hazards connected with a compound stay the same whether it's utilised to make a certain chemical product. When benzene is reacted to generate various derivatives, it no longer remains the molecule benzene and the chemical characteristics of the products might frequently be entirely different. So, the presence of a benzene ring in a compound's structure isn't always a reason for concern—in fact, a huge number of chemicals present in our diet have a benzene ring at some point.