Editorial

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Six carbon ring structure with aromaticity

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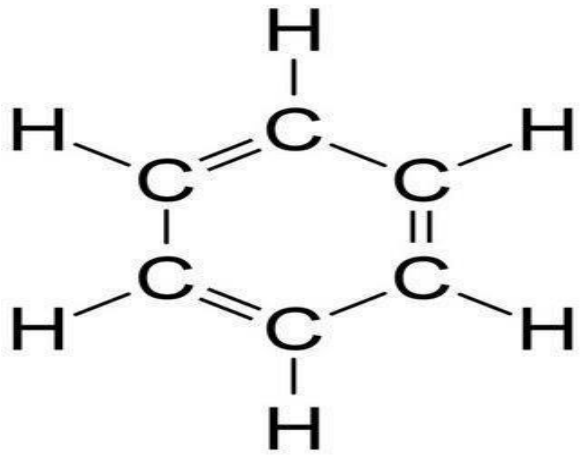
Benzene is an aromatic compound with six carbon structure. The aromatic compounds have more percentage of carbon than the corresponding aliphatic compound and hence they burn with a soothy flame.

The Molecular formula of benzene is C6H6 and it has more unsaturation as compared to hexane (C6H14).Benzene behaves as a saturated compound as it does not readily depolarize bromine water or alkaline KMnO4 like other saturated compounds. Presence of double bond is indicated by the fact that in presence of sunlight or UV light it attackschlorineatoms to give C6H6Cl6.

Kekule's Structure of Benzene

In view of failure of open chain as well as the ring structure , Kekule in 1865 proposed a closed chain structure. According to him, six carbon atoms are linked together in the form of a hexagonal ring.Each carbon atom is attached to one hydrogen. The benzene molecule is flat, planar, in which all the six carbons and six hydrogens are lying in on plane. In order to accout for the tetravalency of carbon atoms , alternate double bond and single bonds between the carbon atoms was proposed.



Benzene

The main support for the structure of is obtained from the fact that benzene gives monosubstituted product (C6H6X). It means that the all the hydrogen atoms are equivalent and are identically placed in the molecule. Also hydrogenation of benzene at 200-300◦ C yields cyclohexane ,which is a ring compound hence there are six carbon atoms in the benzene ring.

Objections of kekule's formula

- From the structure, benzene should show chemical properties similar to alkene due to the presence of three double bonds , but it does not do so.
- In Kekule's structure there is presence of alternative double and single bonds, the bond length between C-C is 1.54nm and C=C is 1.34nm but the actual length of all bonds in benzene is 1.39 nm an dthe bond angle is 120◦., which has been confirmed by the X-ray diffraction studies which couldn't be explained by Kekule's Structure.
- On the basis of kekule's structure, as the benzene containing alternative double double bonds, two dibromic benzene are possible if benzene goes for bromination. In this true structure one bromine atom attacks to single bond, where as on e bromine atom attacks to double bonds.