

SUBJECT - CHEMISTRY

CLASS - B.Sc (Sub. 1st) PART-II

GROUP - C

TOPIC - properties of benzene.

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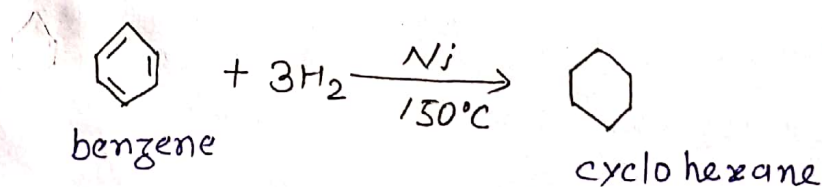
Q Describe the characteristic properties of benzene.

Ans Benzene is a colourless liquid with characteristic b.p 80.5°C m.p. 5.5°C sp. gr 0.87 at 20°C insoluble in water but miscible in many organic solvents e.g ether, alcohol, petroleum etc. It is very inflammable and burns with a smoky luminous flame.

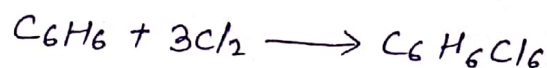
Benzene is remarkable for its chemical stability it is neutral and is not attacked by boiling conc. alkali solution nor by hot conc. HCl It is practically unattacked by oxidising agents like chromic acid and KMnO_4 . It is far more reactive than paraffins.

Addition reactions:

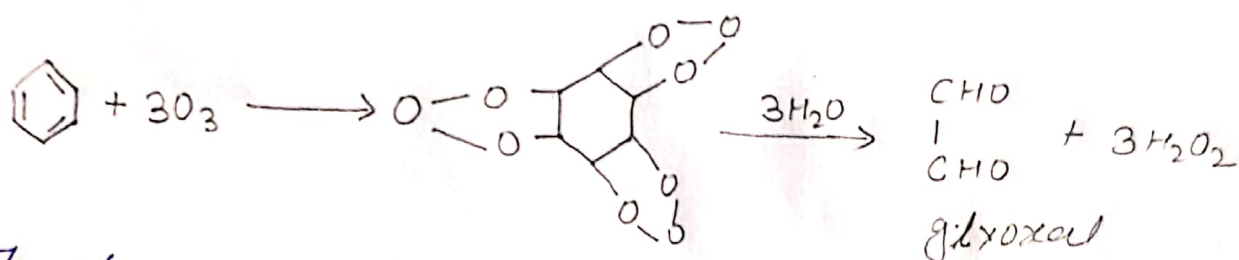
(a) Addition of H_2 : Benzene can be reduced catalytically to dihydro, tetrahydro and finally hexahydro benzene (Cyclohexane) by passing mixture of hydrogen and benzene vapour over Ni at 150°C



(b) Addition of Cl_2 or Br_2 : If benzene is treated Cl_2 or Br_2 in bright sunlight and in absence of halogen carrier, benzene hexachloride or bromide is formed



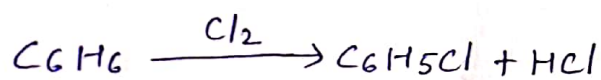
(C) Addition of ozone: Benzene forms a triozonide with ozone. The triozonide is unstable and is decomposed by water into glyoxal



The above reactions indicate that benzene is unsaturated and contains three double bonds in the molecule.

Substitution reactions:

(a) Reactions with halogens (halogenation) chlorine reacts with benzene in presence of a halogen carrier e.g. iodine, iron, FeCl_3 , AlCl_3 etc at ordinary temperature in absence of sunlight to give monochloro benzene, $\text{C}_6\text{H}_5\text{Cl}$ by the substitution of one H-atom by one Cl-atom.



Bromine reacts similarly with benzene, iodine does not react with benzene at ordinary temperature. At high temperatures, iodobenzene is formed if some oxidising agent like iodic acid or HNO_3 is present to remove HI formed in the reaction. HI is a powerful reducing agent and causes a reversal of substitution reaction.

