

Chapter 10. Some P Block Elements

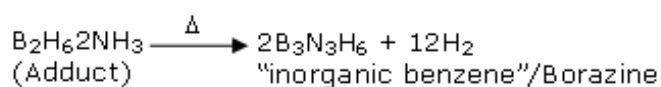
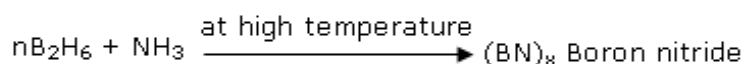
Question-1

What is the reaction between B_2H_6 and NH_3 ?

Solution:

At low temp: $B_2H_6 + 2NH_3 \rightarrow B_2H_6 \cdot 2NH_3$ (Adduct)

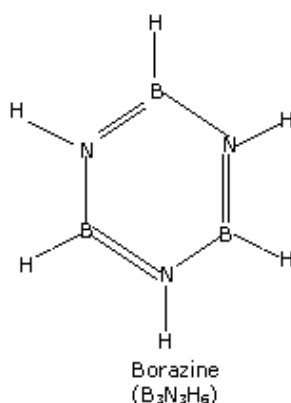
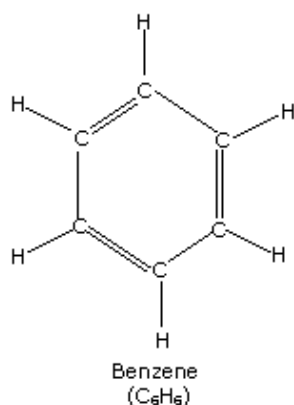
Diammoniate of diborane with excess NH_3



Question-2

Which is called Inorganic benzene?

Solution:



Because of the similarity of the structures of borazine and benzene, borazine is called inorganic benzene.



Question-3

What is the action of heat on boric acid?

Solution:

Boric acid is the trivial name for orthoboric acid H_3BO_3

Above 370K partial removal of water gives metaboric acid $\text{H}_3\text{BO}_3 \rightarrow \text{HBO}_2 + \text{H}_2\text{O}$

Above 430K, metaboric acid gives tetraboric acid

$4\text{HBO}_2 \rightarrow \text{H}_2\text{B}_4\text{O}_7 + \text{H}_2\text{O}$

Question-4

Why is carbon monoxide poisonous?

Solution:

Carbon monoxide binds tightly to the iron (Fe) atom of the haemoglobin in red blood cells and thereby inhibits haemoglobin's ability to bind with oxygen and carry it to the brain and other body tissues. Supply of oxygen to the cells is cut off and thus metabolic activity becomes stand still.

Question-5

Classify 1a following carbides and mention their uses.

Solution:

SiC – Silicon carbide – covalent – Abrasive under the name carborundum

B_4C – Boron carbide – covalent – Shield against radioactive radiation

CaC_2 – Calcium carbide – ionic - to produce acetylene for oxy-acetylene welding.

WC – Tungsten carbide – Interstitial carbide – Due to their hardness and chemical inertness they are used as high speed cutting tools.

Question-6

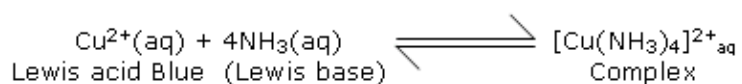
Give a reaction to show ammonia is a Lewis base.

Solution:

Nitrogen of ammonia has a lone pair of electrons. By giving the pair of electrons ammonia acts as a Lewis base.

Ammonia forms co-ordinate linkage with metal ions and forms complex compounds.

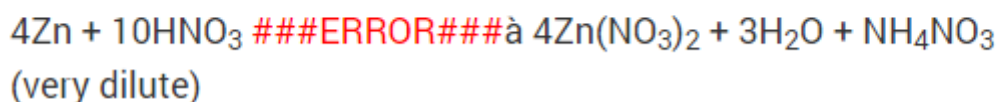
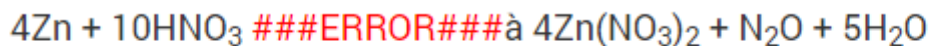
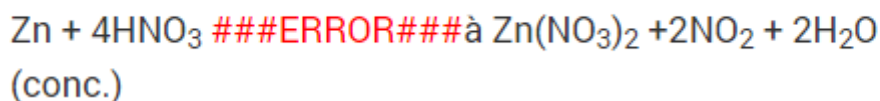
E. g.,



Question-7

What is the action of nitric acid with Zn, S and P?

Solution:



concentrated nitric acid acts as an oxidizing agent.

It oxidizes S and P to their corresponding acids.



Question-8

Zn or Fe evolves hydrogen from dil HCl or dil. H₂SO₄ but not from dil HNO₃. Give reason.

Solution:

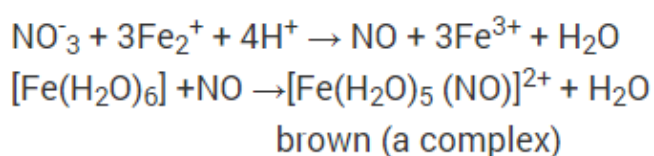
Initially hydrogen will be evolved from dil. HNO₃. But since nitric acid is a strong oxidizing agent and hydrogen is a reducing agent, secondary reactions take place. Nitric acid is reduced into NO, N₂O, N₂ or NH₃, by hydrogen depending upon conditions. Hydrogen is oxidized to H₂O.

Question-9

What is the reaction behind the brown ring test?

Solution:

Brown ring test is the confirmatory test for nitrate ion (acid radical). The test is performed by adding freshly prepared ferrous sulphate to an aqueous solution containing nitrate ion and then carefully adding concentrated sulphuric acid along the sides of the test tube so that a separate layer is formed. A brown ring at the interface between the solution and the sulphuric acid indicates to presence of nitrate ion in solution.



NO is a Lewis base and it gives a nitrosyl complex with ferrous ion.



Question-10

How is ozone layer depleted?

Solution:

Volatile compounds Chlorofluoro carbons (CFC's) are used as aerosol propellants and as refrigerants. They are converted into chlorine atoms by U. V radiation in stratosphere. Chlorine atom decomposes ozone into oxygen at a rate faster than its formation from oxygen. Oxides of Nitrogen also decomposes ozone into oxygen.

