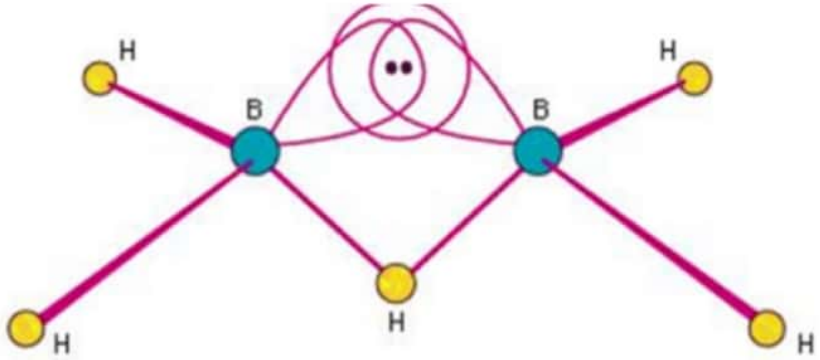
Diborane is a chemical compound that consists of boron and hydrogen atoms and has a molecular formula B_2H_6. This substance is highly unstable at the room temperature with a sweet odour. The ompounds consisting of boron and ydrogen atoms are called boranes. iborane is one of the simplest boron ydrides.

he Boron hydrides mix well with the air forming up explosive mixtures. This substance will ignite rapidly at room temperature. The other names for Diborane are boro ethane, diboron



The structure of Diborane molecule consists of four hydrogen atoms and that of two boron atoms coming on the same plane. In between these planes, there are said to be two dividing atoms of hydrogen.

The boron atom is known to be sp3 hybridized and has four hybrid orbitals. From these four hybrid orbitals, three of the orbitals have one electron each, and of which one is an empty orbital. The two electrons of the hybrid orbitals in each of the boron atoms form 2 bonds with the 1s hydrogen atoms. The two atoms of boron left with that of each unpaired electron orbital and empty orbital forms the two bridgings (B–H–B) bonds with that of the two 1s hydrogen atoms, is also called as the banana bond.

Some of the physical and chemical properties of Diborane are as below:

- Diborane is said to be a colourless and highly flammable type of gas at the room temperatures. At the high concentrations, it ignites rapidly in the presence of moist air at the room temperature.
- It smells sweet.
- It is said to have a boiling point of about 180 K and is a toxic gas.
- It releases a huge amount of energy when burnt in the presence of oxygen.
- Diborane readily hydrolyzes in water to give hydrogen gas and boric acid.
- Most of the diborane are known to

Reactions

– Pure diborane does not react with air or oxygen at room temperature, but it gives B_2O_3 together with large amounts of energy in impure form.

$$B_2H_6 + 3O_2 \rightarrow B_2O_3 + 3H_2O$$

$$\Delta H = -2165 \text{ KJ mol-1}$$

Diborane reacts with methyl alcohol to ive trimethyl Borate.

$$B_2H_6 + 6CH_3OH \rightarrow 2B(OCH_3)_3 + 6H2$$

Reaction with ionic hydrides

It forms metal borohydrides when treated with metal hydrides

– Reaction with ammonia

Diborane is given when treated with excess ammonia at low temperatures. It gives borazole when heated at higher temperatures.

Uses And Applications Of Diborane

Diborane is a chemical substance has many numbers of applications in various fields, of which some are given below:

- Diborane is used as a rocket propellant.
- It is utilized in the manufacture of borophosphosilicate which is a form of glass.
- In most of the chemical reactions, it is employed as a reducing agent.
- Diborane is used as a catalyst and rubber vulcanizer in the polymerization reactions.
- It is even used as a doping agent in the manufacturing of semiconductor devices.