

PHYSICAL PROPERTIES

- Colourless and highly inflammable gas at room temperature.
- At high concentrations, it ignites rapidly in the presence of moist air at room temperature.
- It smells sweet.
- It has boiling point of about 180 K
- It is toxic gas
- It releases huge amount of energy when burnt in the presence of O₂.
- It readily hydrolysed in the water to give hydrogen gas and boric acid.

Chemical Properties:

i) Diboranes reacts with water and alkali to give boric acid and metaborates respectively.



ii) Action of air:

At room temperature pure diborane does not react with air or oxygen but in impure form it gives B₂O₃ along with large amount of heat.



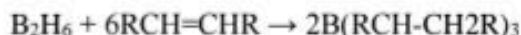
$$\Delta H = -2165 \text{ KJ mol}^{-1}$$

iii) Diborane reacts with methyl alcohol to give trimethyl Borate.



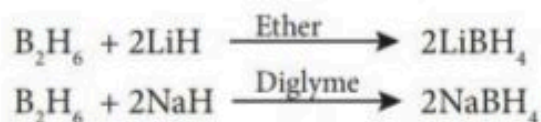
iv) Hydroboration:

Diborane adds on to alkenes and alkynes in ether solvent at room temperature. This reaction is called hydroboration and is highly used in synthetic organic chemistry, especially for anti Markovnikov addition.



v) Reaction with ionic hydrides

When treated with metal hydrides it forms metal borohydrides



vi) Reaction with ammonia:

When treated with excess ammonia at low temperatures diborane gives diboranediammonate. On heating at higher temperatures it gives borazole.

