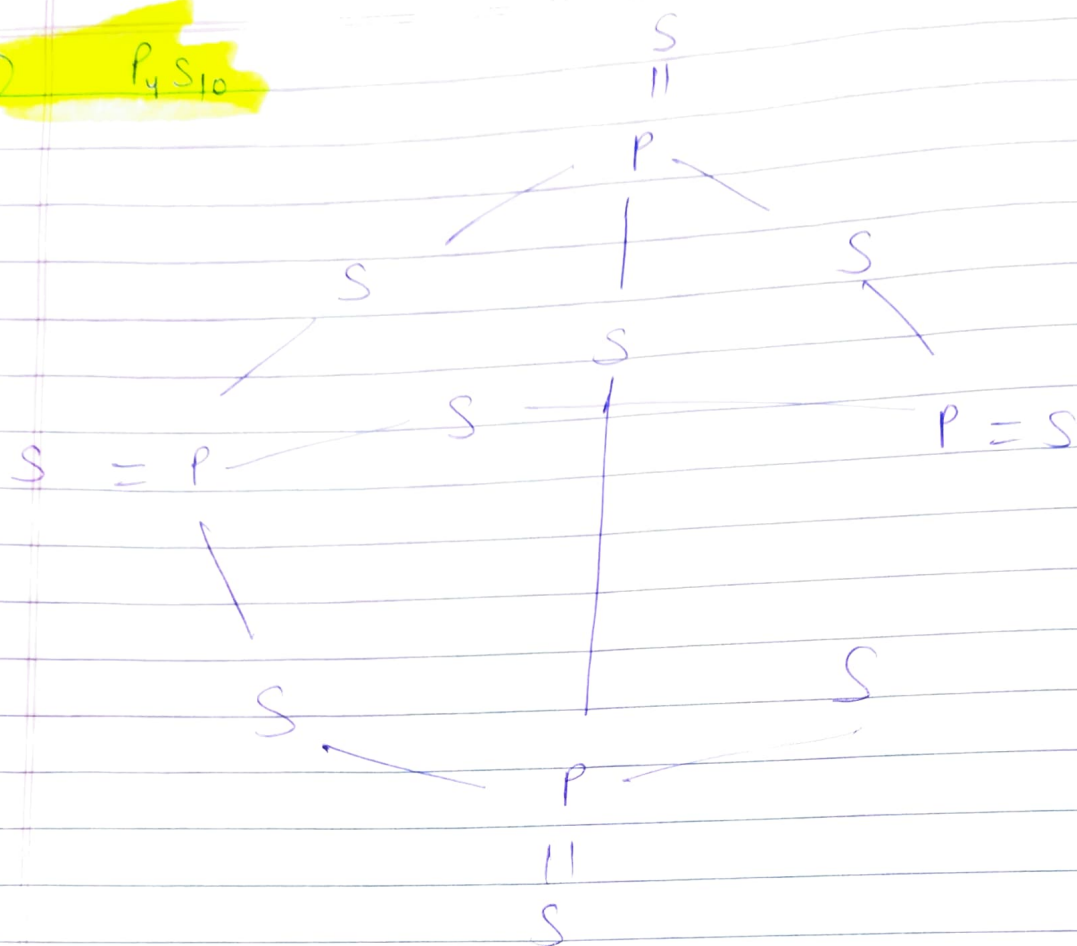


① P_4S_{10}



② Kapustinskii equation :-

$\Rightarrow$ The Kapustinskii equation calculates the lattice energy U_L for an ionic crystal which is experimentally difficult to determine. It is named after Anatol Fedorovich Kapustinski who published the formula in 1956.

$\Rightarrow$ It increases with increasing charge on the ions.

$\Rightarrow$ It is larger for smaller ions.

$$U_L = \frac{CVZ^+Z^-}{r^+ + r^-}$$

V is the number of ions in the formula. (i.e., 2 for NaCl, 3 for MgF_2). C is a constant equal to 1.079×10^5 , radius in pm and U_L is in kJ mol^{-1} .

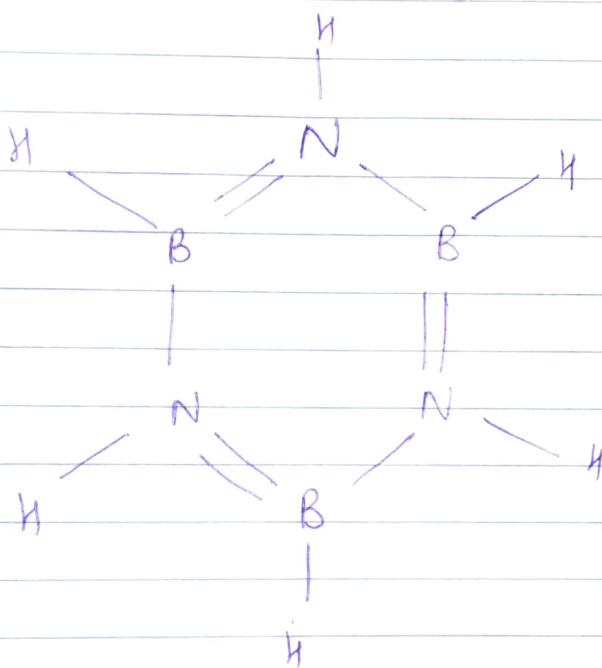
3

4

5

6

Borazine



⇒ Structure of Borazine

- 1> In Borazine both Boron and Nitrogen are sp^2 hybridised
- 2> Each N-atom has one lone pair of electrons while each B-atom has an empty p-orbital

⇒ Preparation :-

① Heating BCl_3 - with NH_4Cl .



(2) By heating a mix. of LiBH_4 and NH_4Cl .

$\Rightarrow \text{NH}_4\text{Cl}$

$\Rightarrow \text{NH}_4\text{Cl} + \text{LiBH}_4 \rightarrow \text{B}_3\text{N}_3\text{H}_6$

(Ammonium chloride) (Lithium Boro hydride)

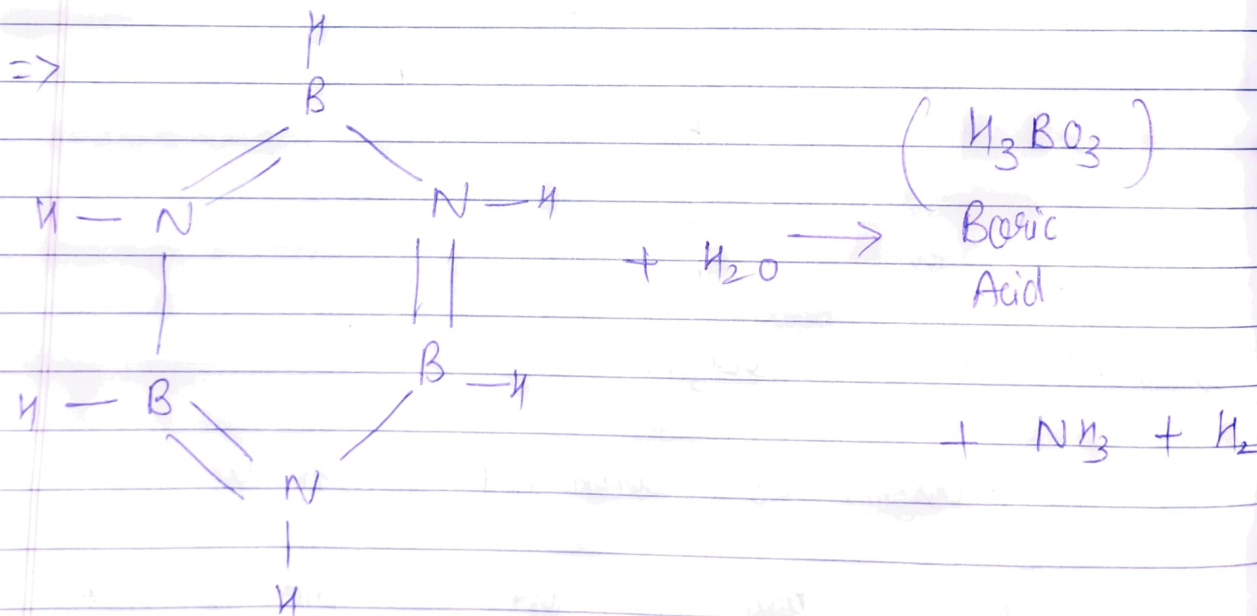
$\Rightarrow$ Physical Property.

$\Rightarrow$ Physical Properties:-

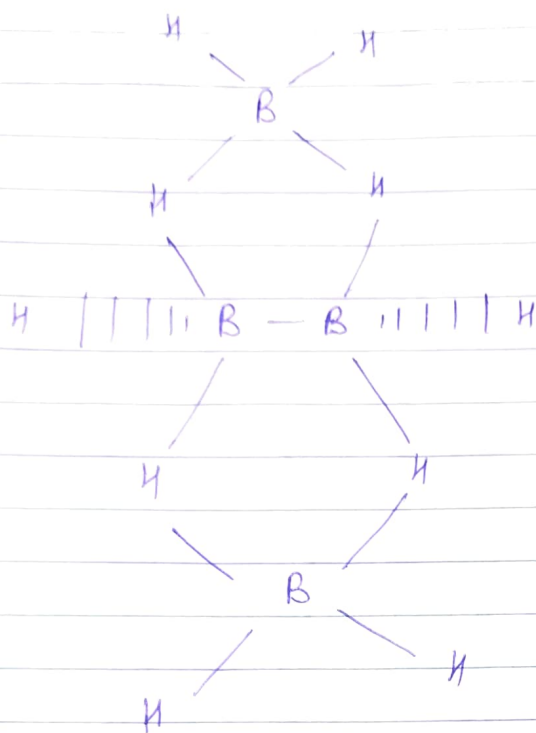
- (i) Colourless
- (ii) Volatile liquid
- (iii) Boiling point Low
- (iv) Melting point Low
- (v) Molecular Weight = 78g.

$\Rightarrow$ Chemical Properties:-

 Hydrolysis of Borazine.



Structure of tetraborane



11) Born-Landé's equation

The Born-Landé equation is a concept originally formulated in 1918 by the Scientist Born and Landé and is used to calculate the lattice energy (measure of the strength of bonds) of a compound. This expression takes into account both the Born interactions as well as the Coulomb attractions.

$$U = \frac{N_A M Z^+ Z^- e^2}{4 \pi \epsilon_0 r} \left(1 - \frac{1}{n} \right)$$

Where N_A = Avogadro Constant

M = Madelung Constant

Z^+ = Numeric charge no. of cation.

Z^- = " " " " Anion.

$e =$ ~~the~~ Charge $1.6 \times 10^{-19} \text{ C}$.

$\epsilon_0 =$ Permittivity of free space.

$r_0 =$ Distance between ions.

$n =$ a number b/w 5 and 12.