**GROUP 13 ELEMENTS: THE BORON FAMILY Oxidation state and trends in chemical reactivity:** General oxidation state = +3 **Reactivity towards acids and alkalies:**  $2AI(s) + 6HCI(aq) \rightarrow 2AI^{3+}(aq) + 6CI^{-}(aq) + 3H_{2}(g)$  $2AI(s) + 2NaOH(aq) + 6H2O(1) \rightarrow 2Na^{+}[AI(OH)4]^{-}(aq) + 3H_{2}(g)$  Sodium tetrahydroxoaluminate (III) **Reactivity towards halogens:**  $2E(s) + 3X_{2}(g) \rightarrow 2EX_{3}(s)$  (X = F, CI, Br, I) **BORON (B):** 

Some important reactions of boron and its compounds:





1. Small amines such as NH $_3$ , CH $_3$ NH $_2$  and (CH $_3$ ) $_2$ NH give unsymmetrical cleavage of diborane.

 $B_2H_6 + 2NH_3 \rightarrow [H_2B(NH_3)_2]^+ + [BH_4]^-$ 

2. Large amines such as (CH<sub>3</sub>)<sub>3</sub>N and pyridine give symmetrical cleavage of diborane.

 $\begin{array}{l} 2(CH_3)_3N + B_2H_6 \rightarrow 2H_3B \leftarrow N(CH_3)_3 \\ B_2H_6 + 2CO \xrightarrow{200^\circ\text{C}, \ 20 \text{ atm}} 2BH_3 \text{ CO(borane carbonyl)} \end{array}$