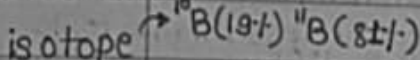
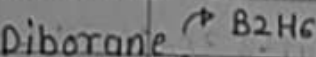
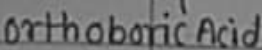
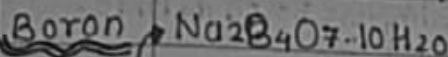
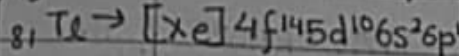
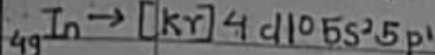
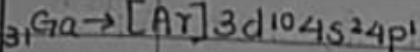
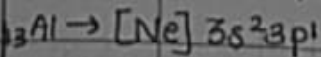
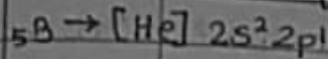
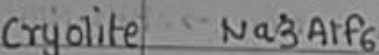
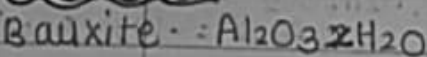


Group 13 (Boron family)



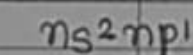
Aluminium



8.3% mass

3rd most Abundant

General Elec. Configurⁿ

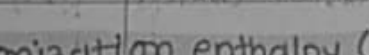
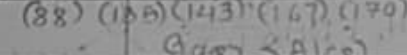
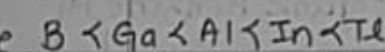


Atomic Radius (Tse)

but due to additional

poor screening eff

Tse nuclear charge



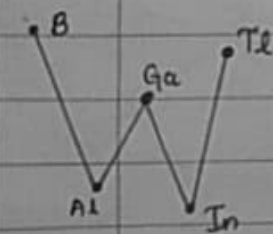
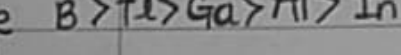
Ionization enthalpy (Ise)

but becoz of

→ d & f orbital

→ Tse eff nuclear charge

→ IE Tse



electronegativity (Ise)

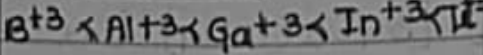
but (Tse) aft Al becoz of

discrepancies in atomic

size of elements

ie $B > Tl > In > Ga > Al$

ionic radius:-



PHYSICAL PROPERTIES:-

Boron → Non metallic

→ Extremely hard black

coloured solid

→ many allotropic forms

→ very strong crystalline

Structure/Lattice

→ High MP & B.P

rest of all are soft metals

→ low m.p & high density

Ga → low m.p (303K)

→ exist in liquid summer

→ high B.P (2676K)

→ for measuring high temp.

→ density inc down the group

(B → Tl)

CHEMICAL PROPERTIES:-

(1) oxidation state

Group oxidⁿ state = 3

top to bottom (B → Tl)

+3 o.s (stability) ↓ se

+1 o.s (stability) ↑ se

B (+3) most stable

(+1) doesn't exist

Tl (+3) doesn't exist

(+1) most stable

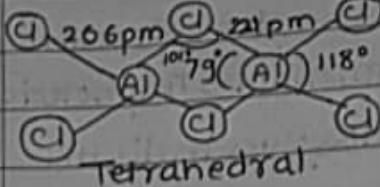
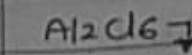
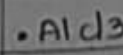
• BF_3 → e⁻ deficient species

ie Lewis Acid

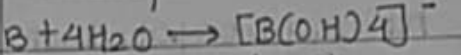
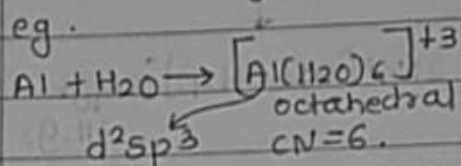
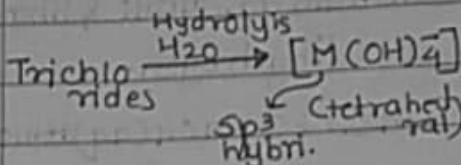
→ makes coordinⁿ bond

with NH_3 ie e⁻ rich species

(NH_3 shares its l.p while bonding)



Tetrahedral
AlCl₃ → achieves stability by forming dimer (through Halogen Bridges)



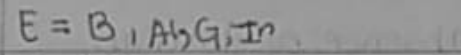
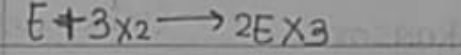
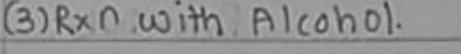
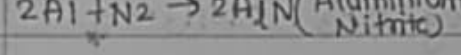
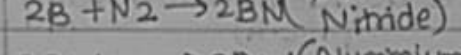
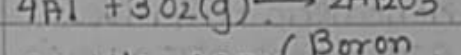
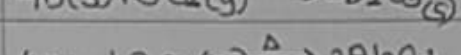
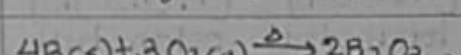
(2) Reactivity with Air

Boron → unreactive in crystalline form

→ Al_2O_3

Al → forms thin layer on surface ie. protectⁿ of metal from further attack

4B(s) + 3O₂(g) → 2B₂O₃(s)



(forms trihalides with rxn of halogens) except TlI₃ →

