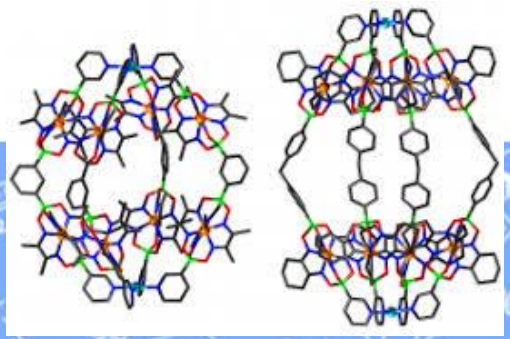
P BLOCK ELEMENTS

#BOUNCEBACK

gp 13
&
gp 14



Sakshi Vora

IIT Roorkee

- 7+ years Teaching experience
- 10th, 12th CBSE State Topper
- KVPY fellow

BounceBack

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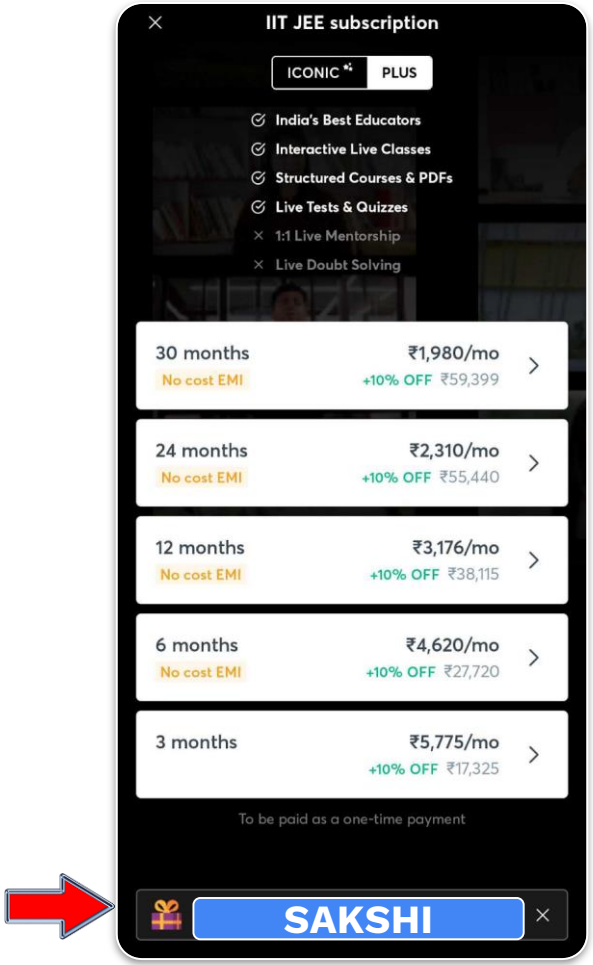
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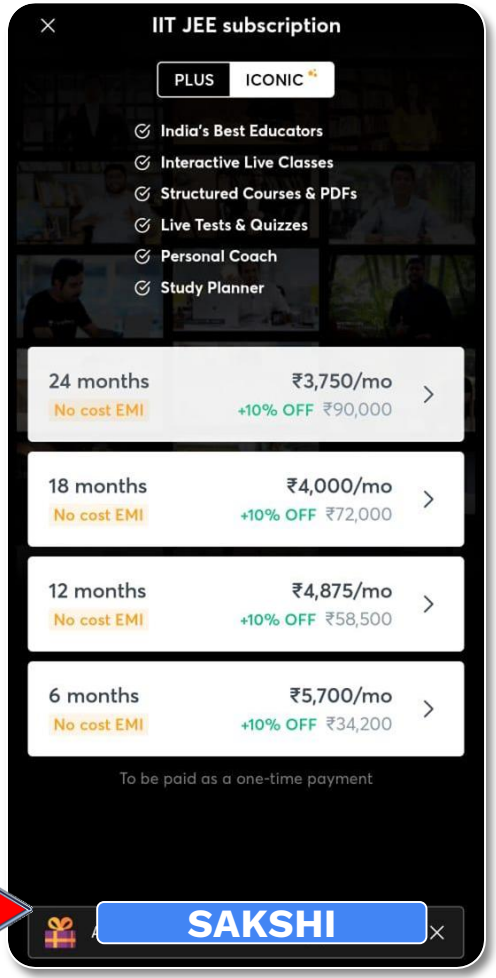
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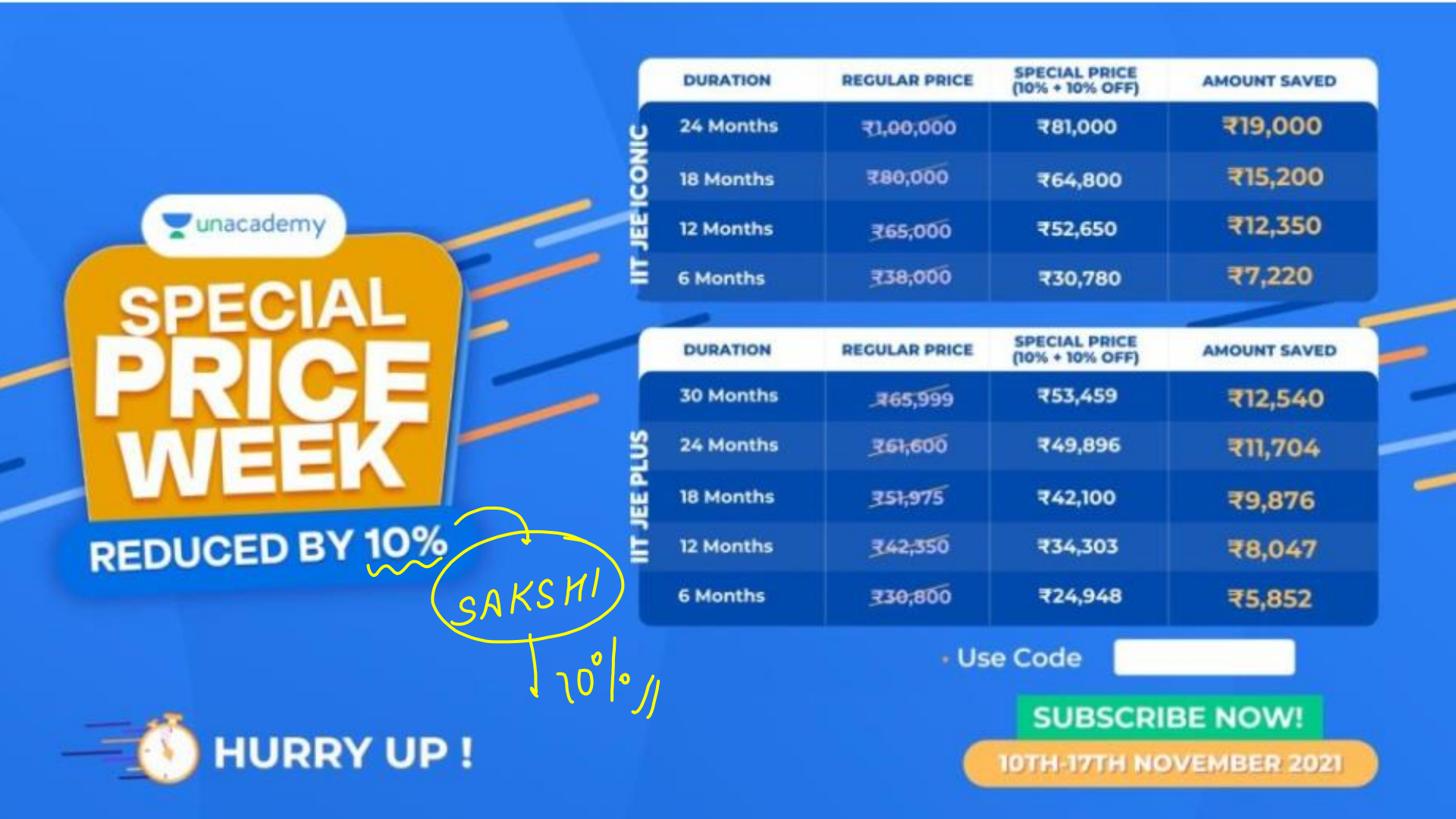
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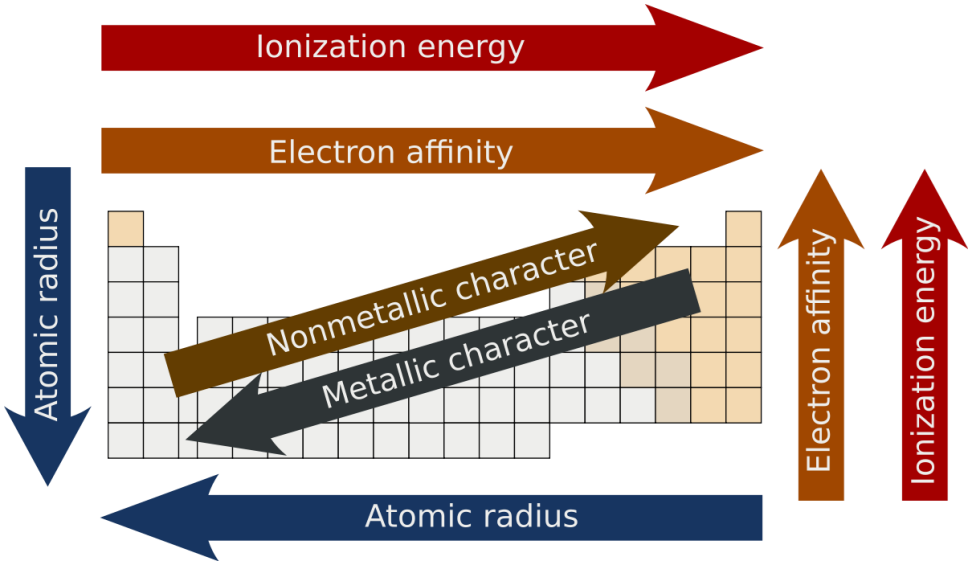
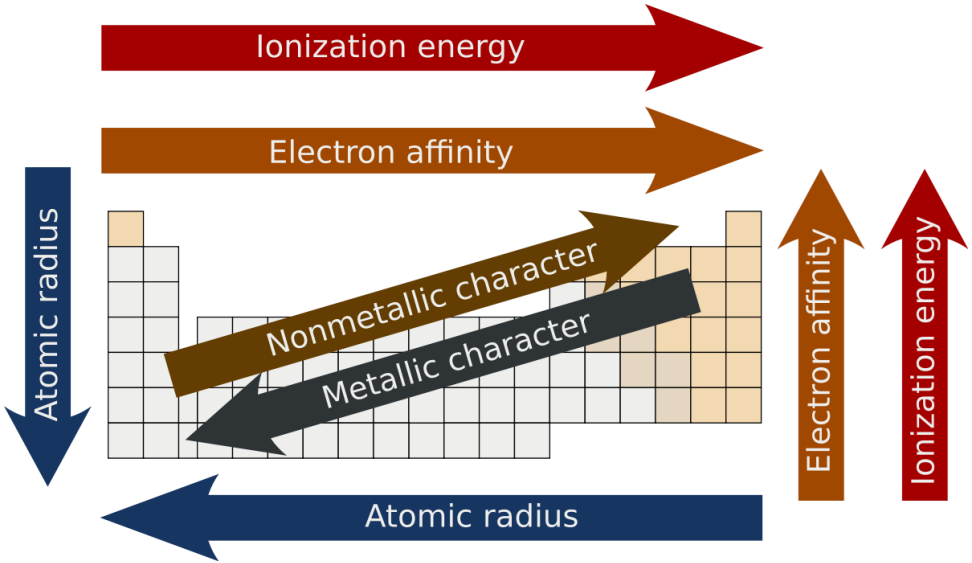
p block elements



Group 13


Ionization energy
Electron affinity
Atomic radius
Nonmetallic character
Metallic character
Electron affinity
Ionization energy
Atomic radius

Group - 13

d, f → poor shielders.

B — Al — Ga — In — Tl

B → Non metal

Al, Ga, In, Tl → metal

ns inert

B
Al
Ga
In
Tl

+3 ← B → [He] $2s^2 2p^1$

+3 ← Al → [Ne] $3s^2 3p^1$

+3, +1 ← Ga → [Ar] $3d^{10} 4s^2 4p^1$

+3, +1 ← In → [Kr] $4d^{10} 5s^2 5p^1$

+1 ← Tl → [Xe] $4f^{14} 5d^{10} 6s^2 6p^1$

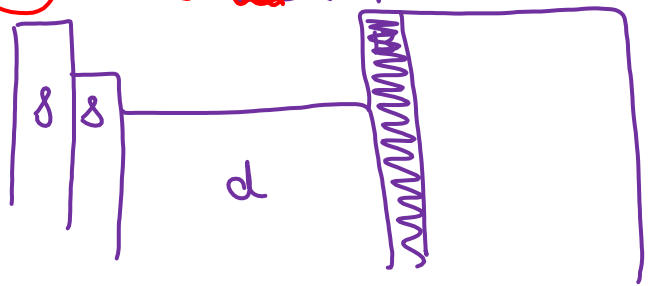
tough

3d

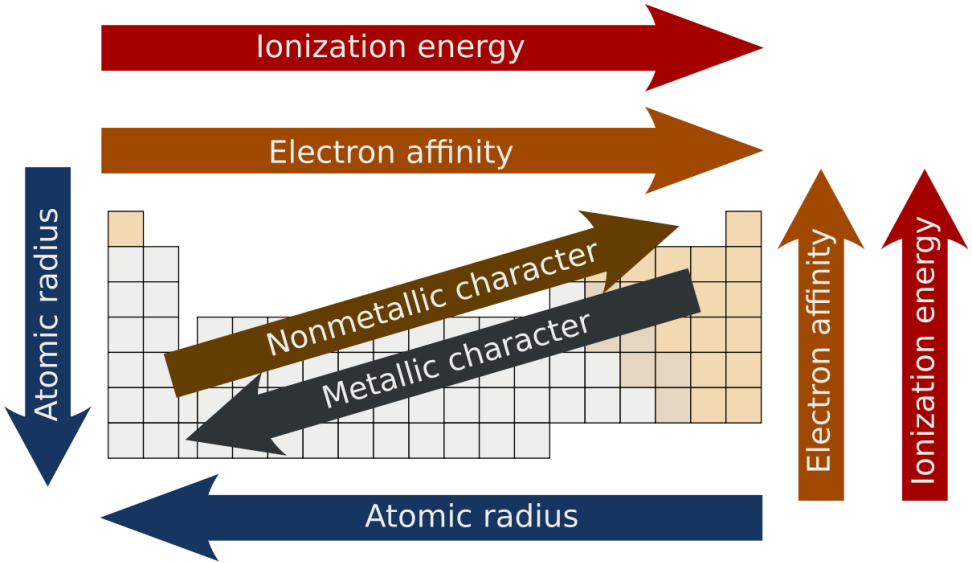
4d

4f

3d 4d, 4f



Variations in group 13



Atomic Radius

jee adv 2016.

Down the group size increases

B < Al > Ga < In < Tl

B < Ga < Al < In < Tl

expected

no of shells ↑

size ↑

4fe⁻

B < Al < Ga < In < Tl

3d e⁻s

71%

livedaily me/atoms

Ionization energy

B > Al < Ga > In < Tl

FINAL ORDER

B > Tl > Ga > Al > In

Size

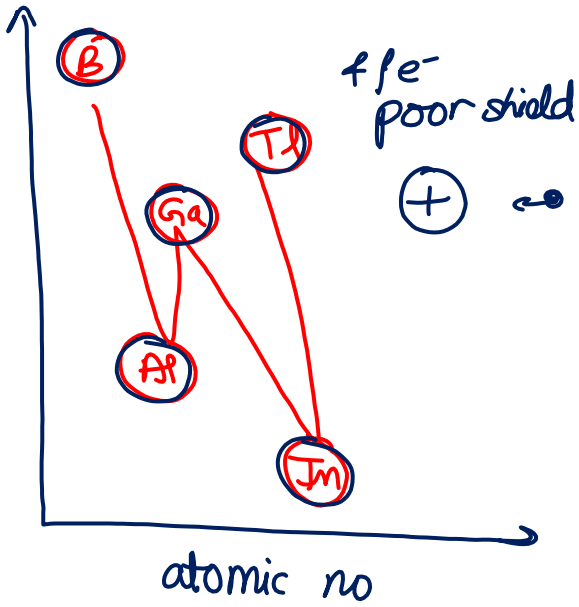
B < Al > Ga < In < Tl

size inc

size dec

In → Tl

size ↑



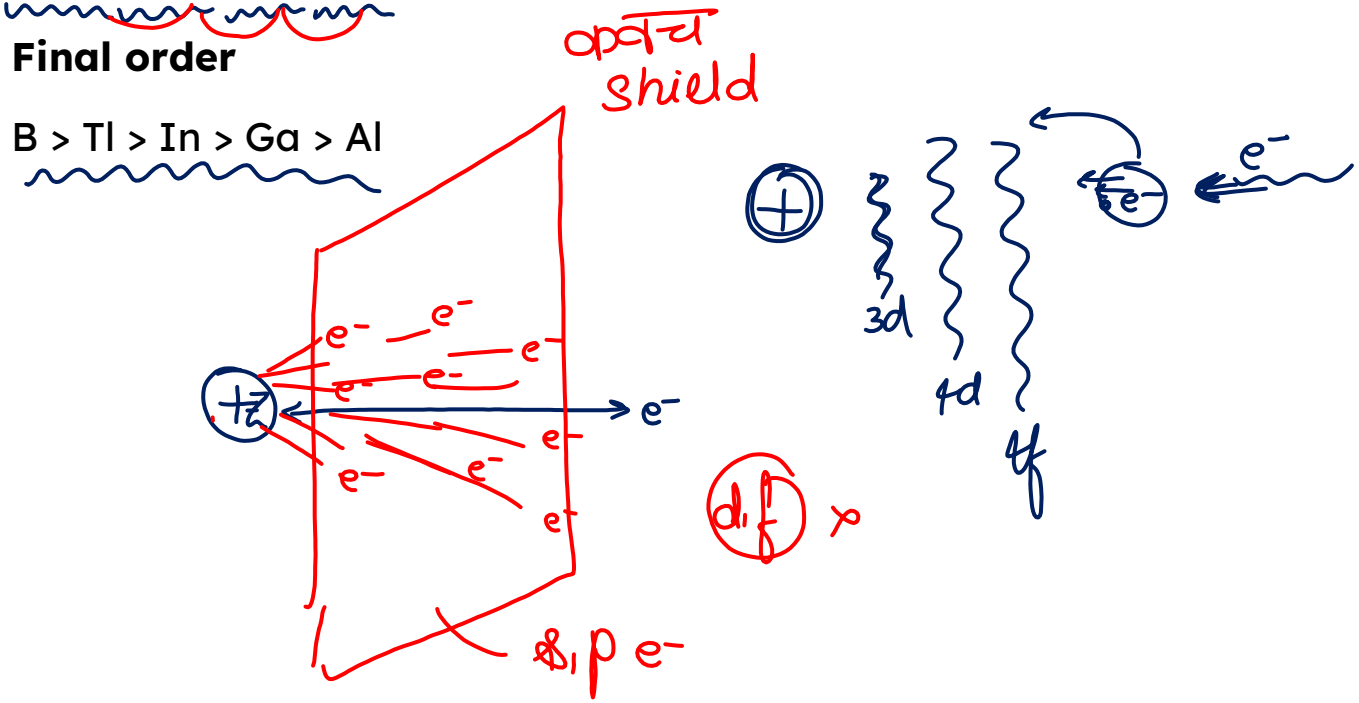
Electronegativity

3de⁻ 4de⁻ 4f⁻

B > Al < Ga < In < Tl

Final order

B > Tl > In > Ga > Al

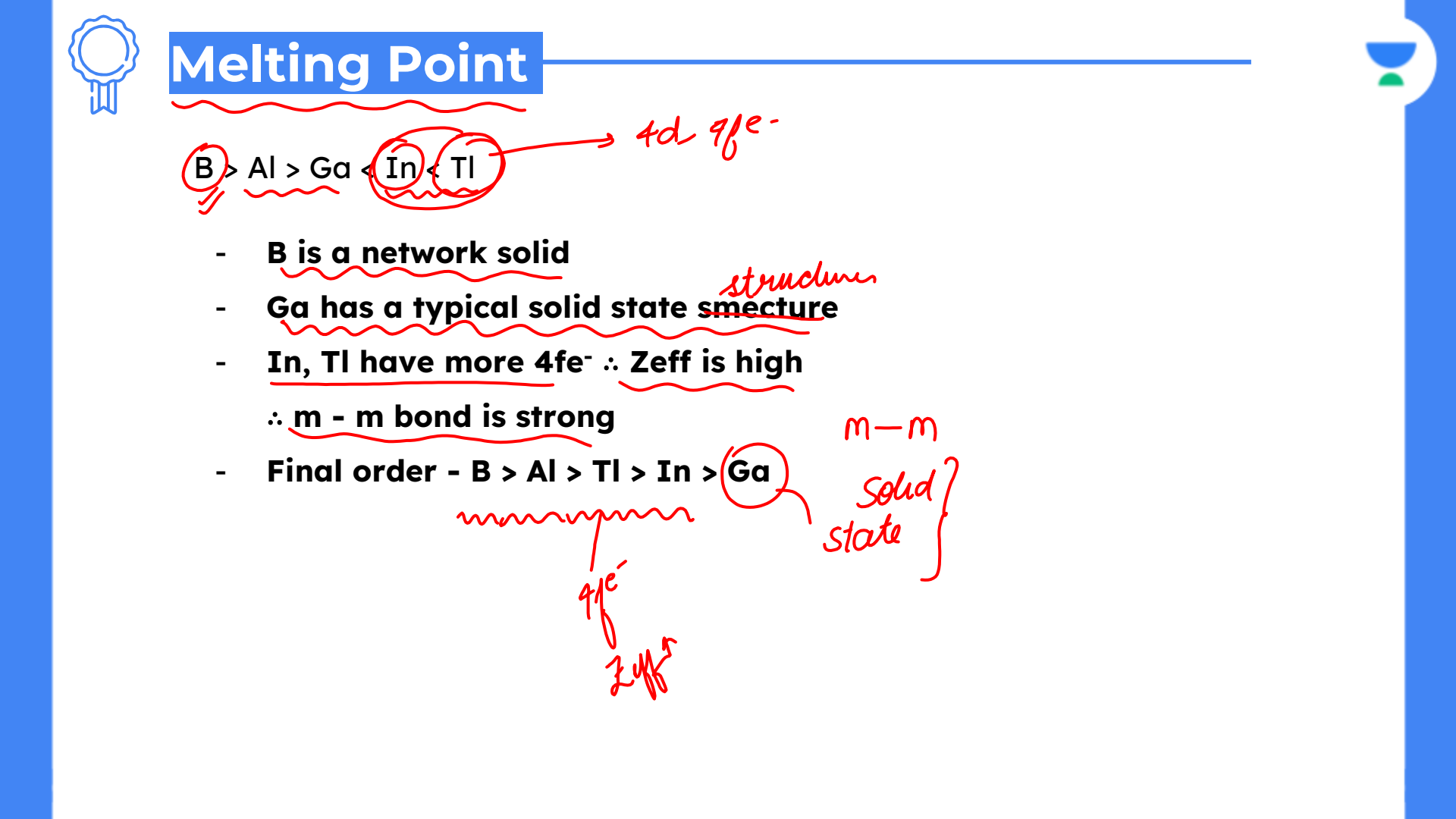


Melting Point

B > Al > Ga < In < Tl

- B is a network solid
- Ga has a typical solid state smecture
- In, Tl have more 4fe⁻ ∴ Zeff is high

  ∴ m - m bond is strong
- Final order - B > Al > Tl > In > Ga



Oxidation state

ns^2np^1

+3

B shows +3 Al shows +3

Ga +3, +1

In +3 +1

due to inert pair effect

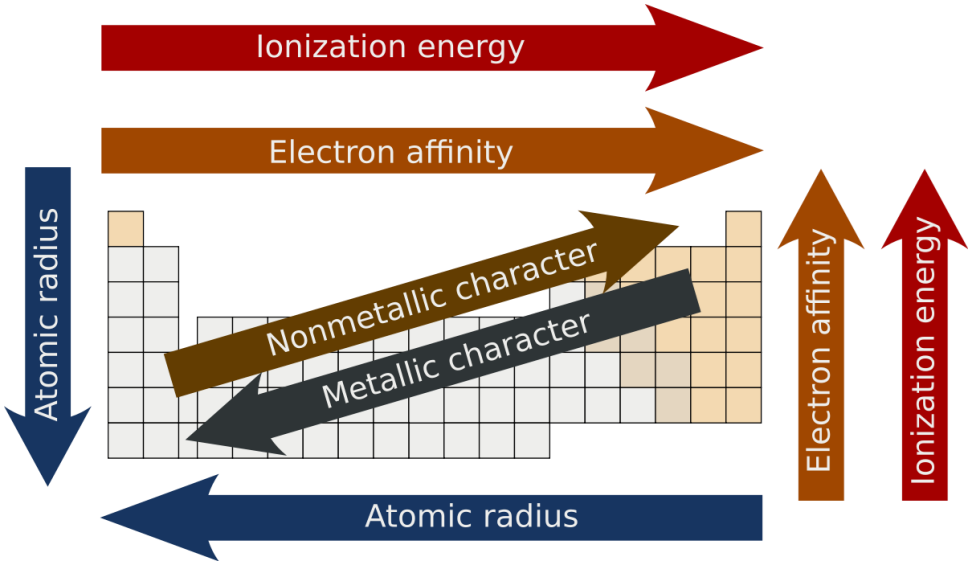
Tl +3, +1 — dominating

Stability of +1 ↑ while stability of +3 ↓ as we move top to bottom

$Ga^{+} < In^{+} < Tl^{+}$

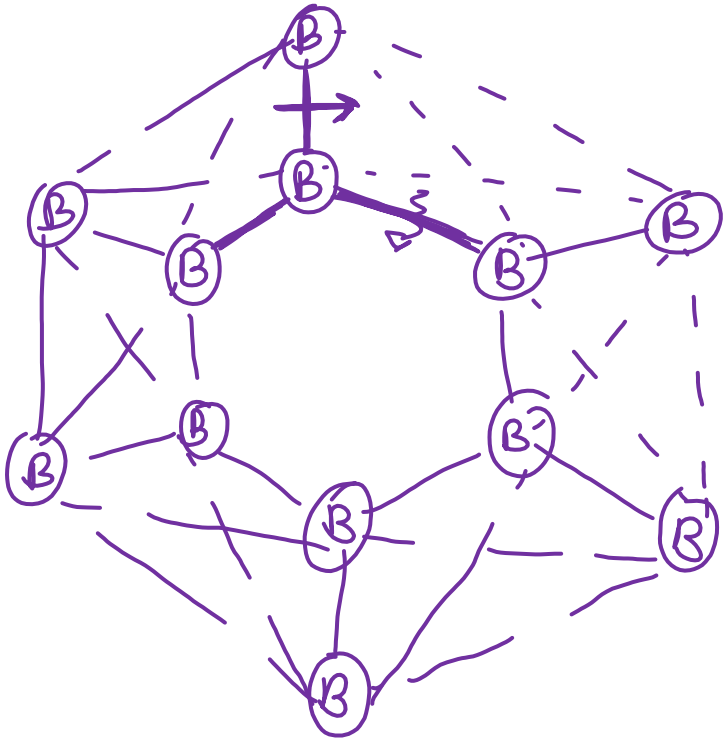
$Ga^{+3} > In^{+3} > Tl^{+3}$

Structure of Boron



Structure of Boron

Boron's Network solid having B_{12} icosahedral units



12 corners
20 faces

3D- network st

melt ↑

Reaction with air and water

gp 13 – E → B/Al

E + air → No reaction

RT

B is network solid , Al → form protective layer of oxide

$B + air \longrightarrow B_2O_3 + BN$

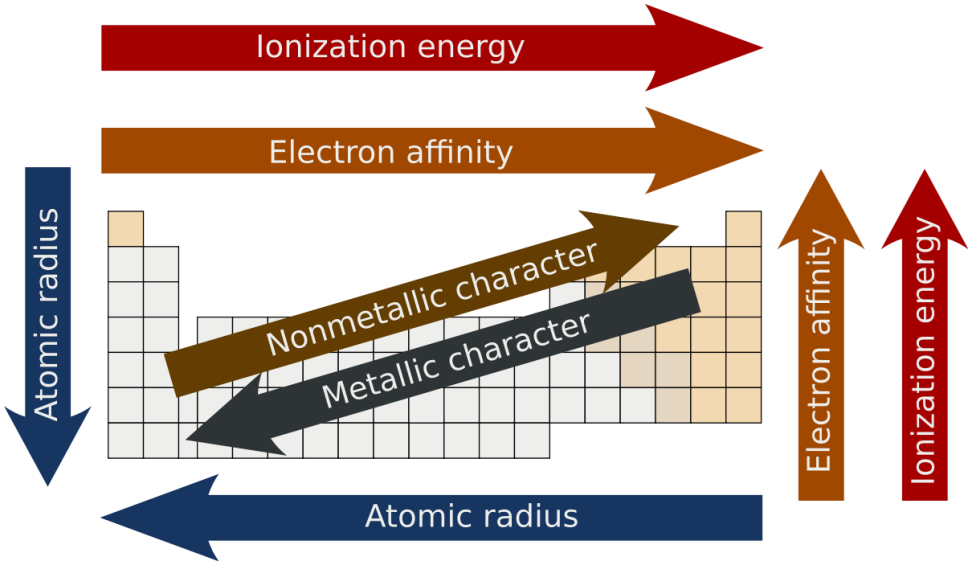
$Al + air \longrightarrow Al_2O_3$

Li Be . . B
Na Mg Al
K Ca Ga
Rb Sr In
Cs Ba Tl

2. Reaction with water

E + water → No reaction

Chemical properties : group 13



Reaction with alkali

[non metal $\xrightarrow{O_2}$ oxide → oxo acid parent ic acid]

B_{cryst} + NaOH → no reaction

B_{amorp} + NaOH → $H_2\uparrow$ + $NaBO_2$

Al + NaOH → $H_2\uparrow$ + $NaAlO_2$

+3 max

B

H_3BO_3

+3

+6

S

+6

H_2SO_4

sulphuric acid

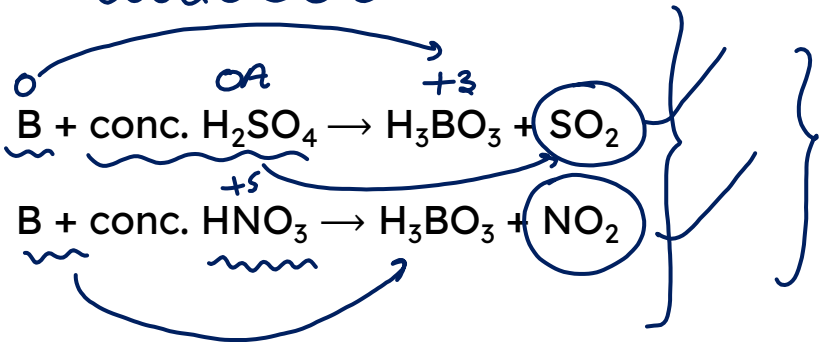
+4

H_2SO_3

sulphurous acid

Reaction with acid

B + Conc. oxidising acid →



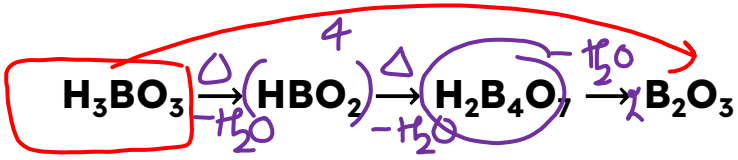
repeat – gp 15, 16.

Reactions of Boron

Boron (amorphous)

- **air** (Δ) → B_2O_3
- **N_2** (Δ) → BN
- **C** → B_4C
- **Dil acid** → ✗
- **Conc acid** (hot/oxd) → H_3BO_3 + SO_2 + NO_2
- **water** → ✗

Reactions of Boric acid & Borax



$Na_2B_4O_7 10H_2O \xrightarrow{H_2O} NaOH + H_3BO_3$

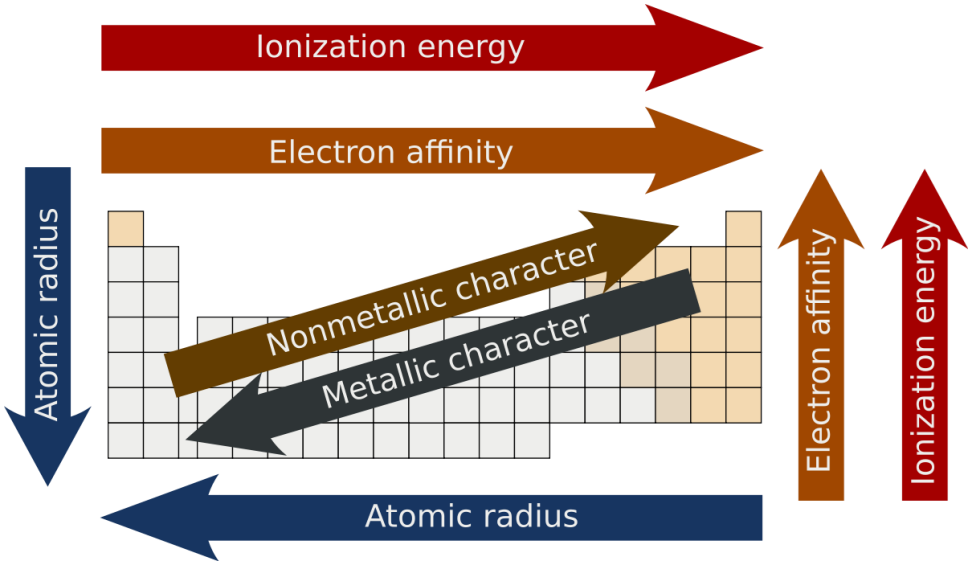
Borax

$\xrightarrow{HCl} NaCl + H_3BO_3$

$\xrightarrow{\Delta} Na_2B_4O_7 \xrightarrow{\Delta} B_2O_3 + NaBO_2$

Swells up

Extraction of Boron



Extraction of Boron

Extraction from minerals :

Boron may be obtained by treating borax with hot concentrated HCl, igniting the boric acid H_3BO_3 to give the oxide B_2O_3 and finally reduced with Mg.

$$2Ca_2B_6O_{11} + 3Na_2CO_3 + H_2O \longrightarrow 3Na_2B_4O_7 + 3CaCO_3 \downarrow + Ca(OH)_2$$

Colemanite

$$Na_2B_4O_7 + 2HCl \longrightarrow 2NaCl + H_2B_4O_7$$

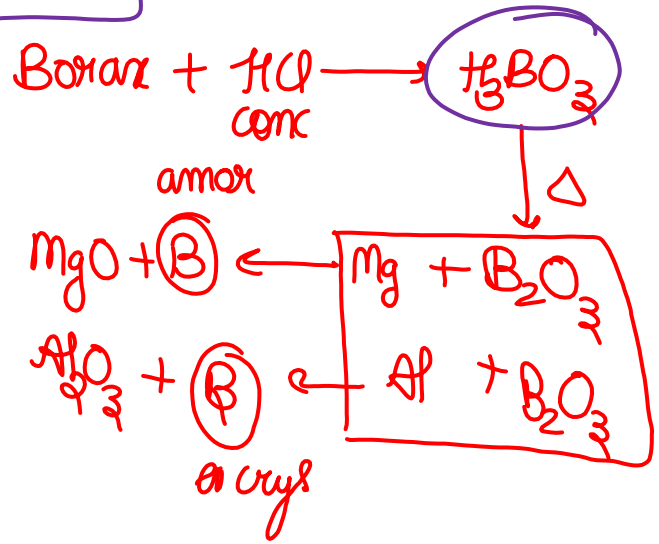
Borax

$$H_2B_4O_7 + 5H_2O \longrightarrow 4H_3BO_3$$

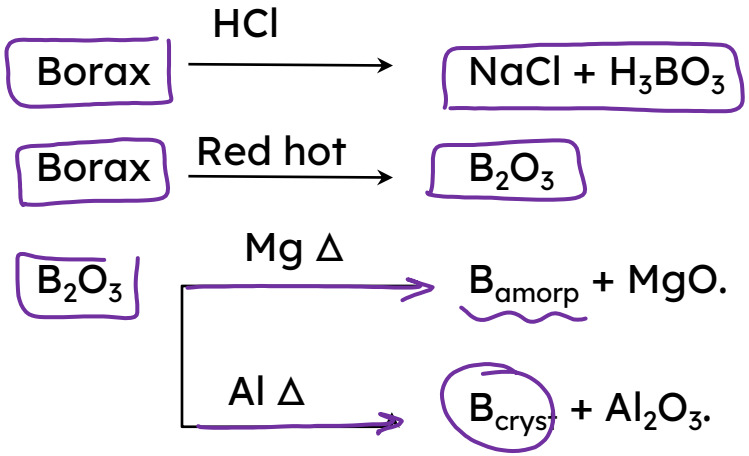
$$2H_3BO_3 \longrightarrow B_2O_3 + 3H_2O$$

$$B_2O_3 + 3Mg \longrightarrow 2B + 3MgO$$

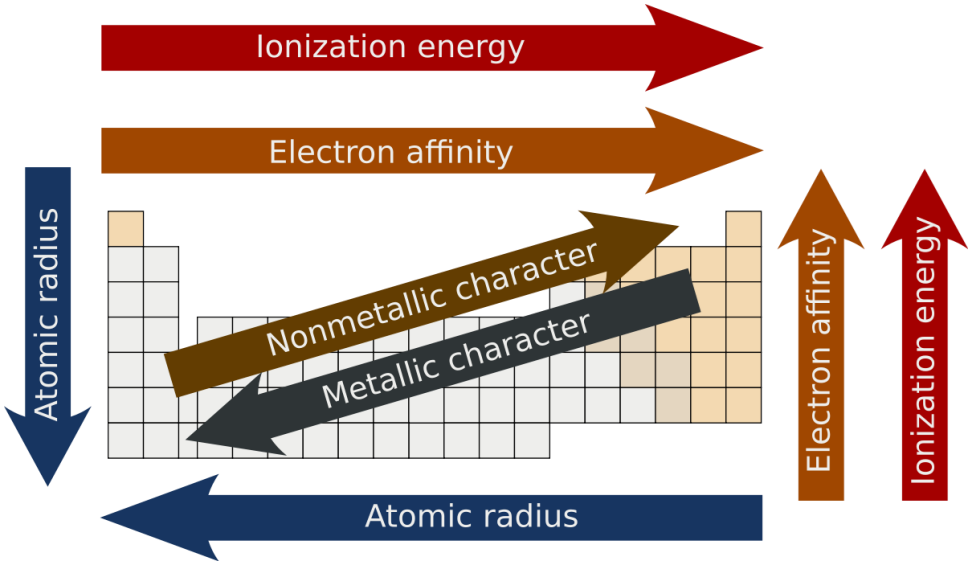
amorp



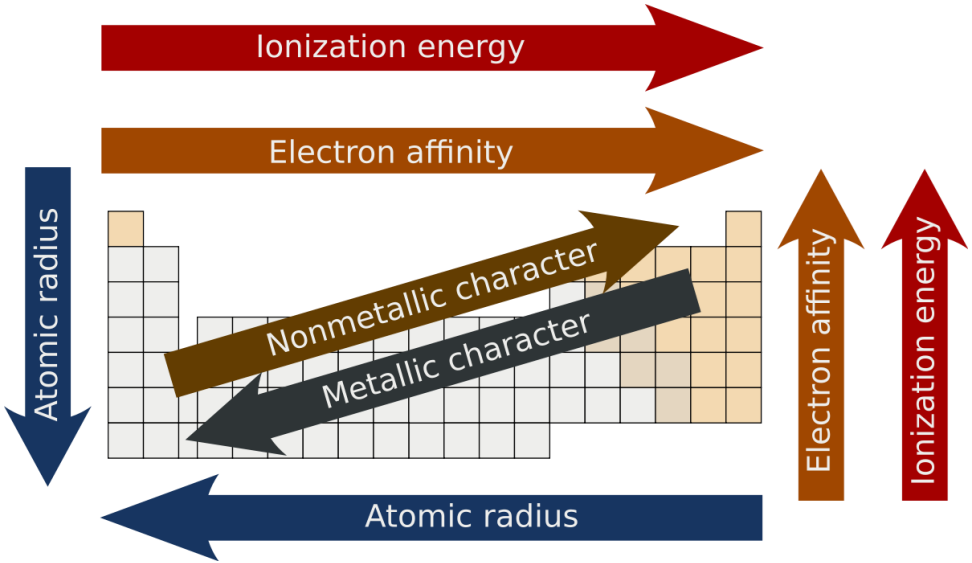
Preparation of Boron



Compounds of B



Diborane


Ionization energy
Electron affinity
Atomic radius
Nonmetallic character
Metallic character
Electron affinity
Ionization energy
Atomic radius

Diborane

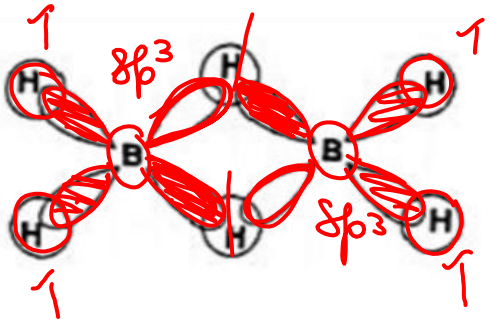
B_2H_6(Diborane)

Structure of Diborane :

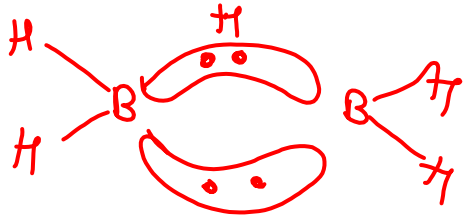
B = $1s^2\ 2s^2\ 2p^1$

$1s^2$	$2s^1$	$2p_x^1$	$2p_y^1$	$2p_z$

sp^3 Hybridisation

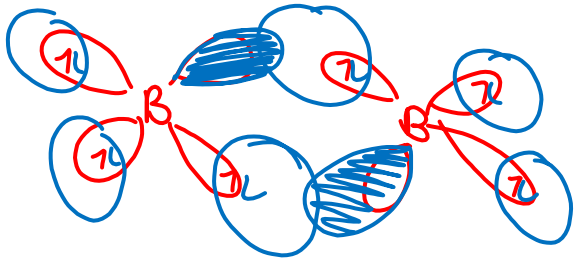


$4\ \{sp^3 - s\}\ 2\{sp^3 - s - sp^3\}$



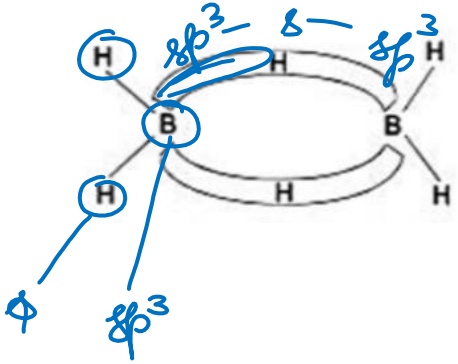
Diborane

- 4 terminal H-are bonded by σ bond & remaining 2H are bridging hydrogens and if these are broken then dimer become monomer.
- Boron undergoes sp^3 hybridisation 3 of its sp^3 hybridised orbitals contain one e^- each & fourth sp^3 hybrid orbital is vacant.
- 3 of these sp^3 hybrid orbitals get overlapped by s orbitals of 3 hydrogen atoms
- One of the sp^3 hybrid orbitals which have been overlapped by s orbital of hydrogen gets overlapped by vacant sp^3 hybrid orbital of 2^{nd} boron atom and its vice versa.



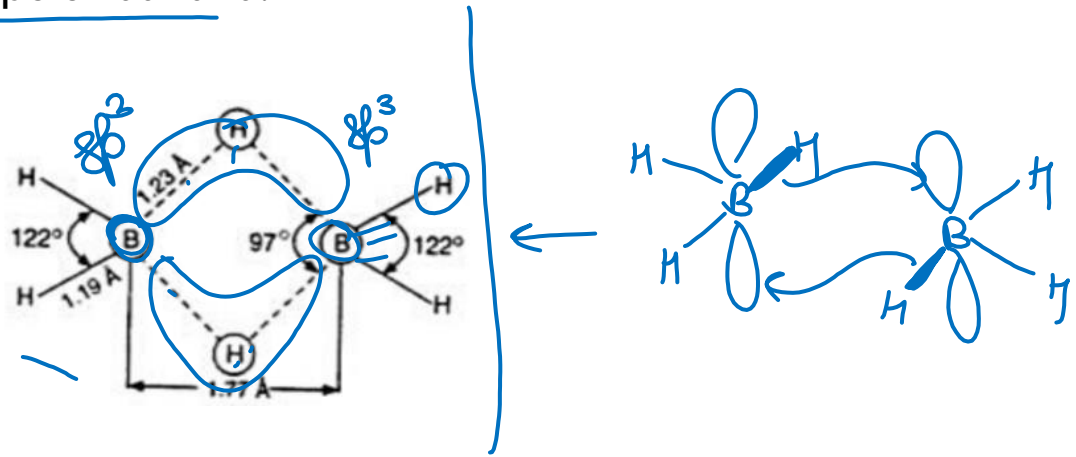
Diborane

By this two type of overlapping take place 4(sp^3 - s) overlap bonds & 2 (sp^3 - s - sp^3) overlap bonds.



Diborane

- H is held in this bond by forces of attraction from B
- This bond is called 3 centered two electron bonds. 3C–2e⁻
- It is also called Banana bonds.
- Due to repulsion between the two hydrogen nuclei, the delocalised orbitals of bridges are bent away from each other on the middle giving the shape of banana.



Preparation of Diborane :

$BF_3 + LiAlH_4$ (H^- donor) $\longrightarrow B_2H_6 + LiF + AlF_3$ → Jee main (p-block ≈)

$I_2 + NaBH_4 \longrightarrow B_2H_6 + NaI + H_2$

$NaH.BH_3$

$NaH + BH_3 \rightarrow$ (H^-)

$BF_3 + NaH \longrightarrow B_2H_6 + NaF$

$Mg_3B_2 + H_2O \longrightarrow Mg(OH)_2 + B_2H_6$

H^+ OH^-

Chemical reactions of B_2H_6 :

$B_2H_6 + O_2 \longrightarrow B_2O_3 + H_2O$

$B_2H_6 + H_2O \longrightarrow H_3BO_3 + H_2\uparrow$

Hydrogen

$B_2H_6 + 2NH_3 \longrightarrow [BH_2(NH_3)_2]^+ + [BH_4]^-$

$\Delta \approx 200°C$

$B_3N_3H_6 + H_2\uparrow$

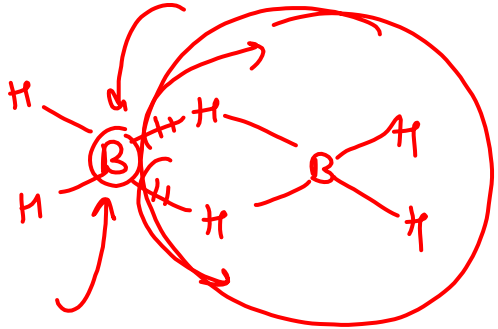
Borazine
inorg Benzene

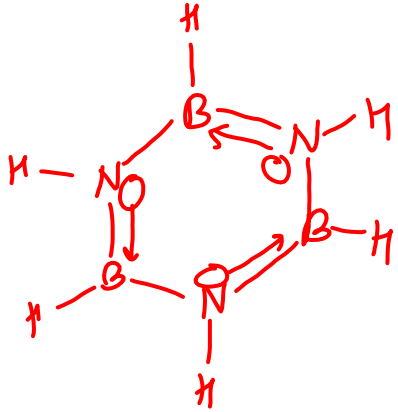
$\Delta \approx 700°$

BN (hexagonal)

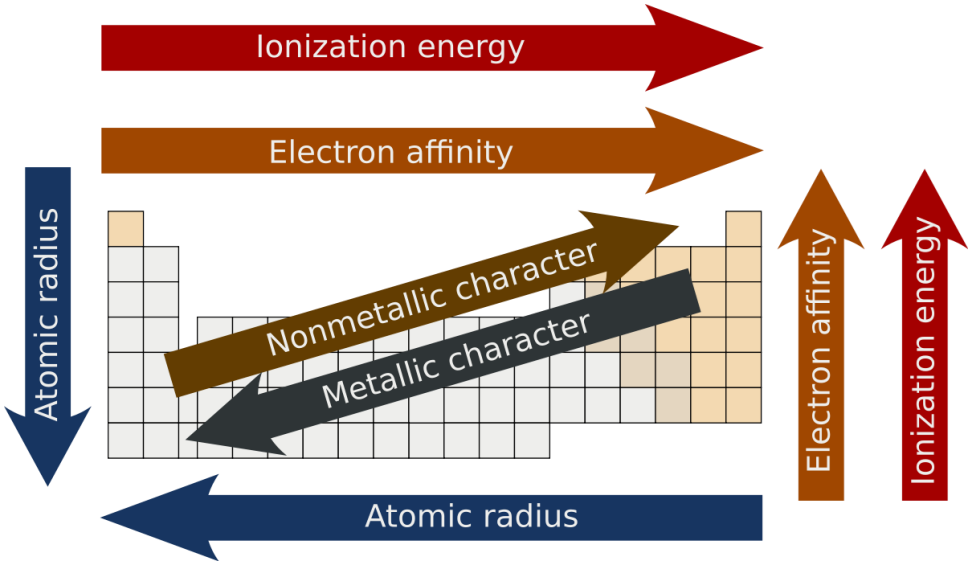
High temp, pressure

BN (cubic)





Boric acid


Ionization energy
Electron affinity
Atomic radius
Nonmetallic character
Metallic character
Electron affinity
Ionization energy
Atomic radius

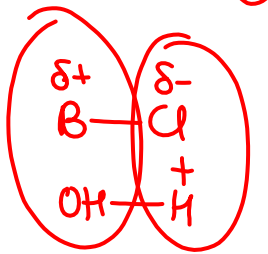
Boric acid

$Na_2B_4O_7 + HCl \rightarrow NaCl + H_3BO_3$

$B_2O_3 \xrightarrow{H_2O} H_3BO_3$

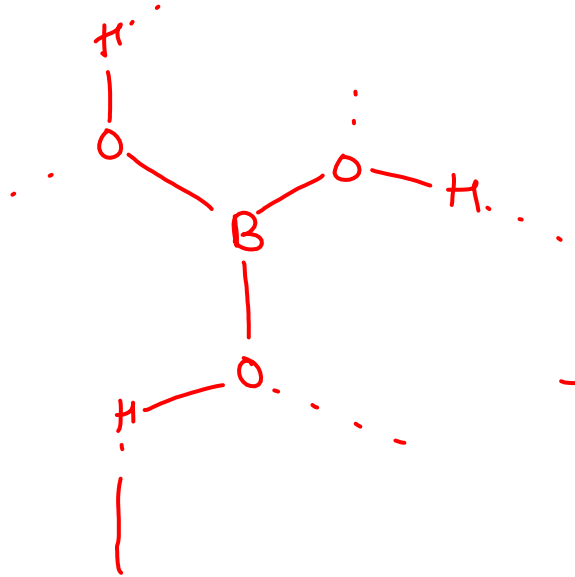
$BCl_3 \rightarrow H_3BO_3 + HCl$

$B_2H_6 \xrightarrow{H_2O} H_3BO_3 + H_2\uparrow$



Boric acid

H_3BO_3 white crystalline solid, slippery in nature sparingly soluble in water, but soluble in hot water.



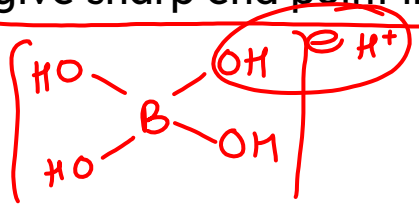
Planar structure

Boric acid

H_3BO_3 is a weak monobasic lewis Acid

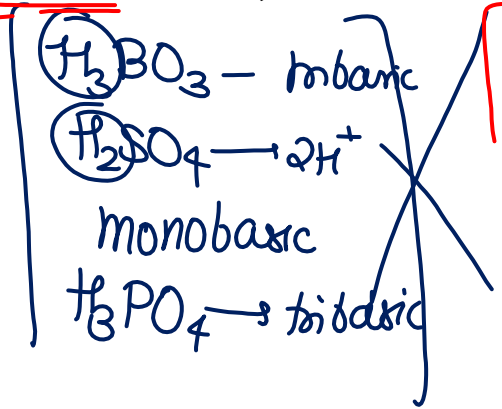
Due to weak acidic nature it does not give sharp end point in acid base titration

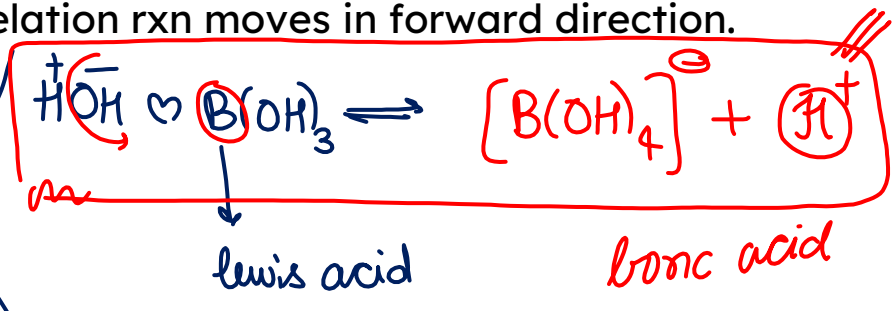
$H_3BO_3 + NaOH \rightleftarrows Na[B(OH)_4]$



To obtained sharp end point

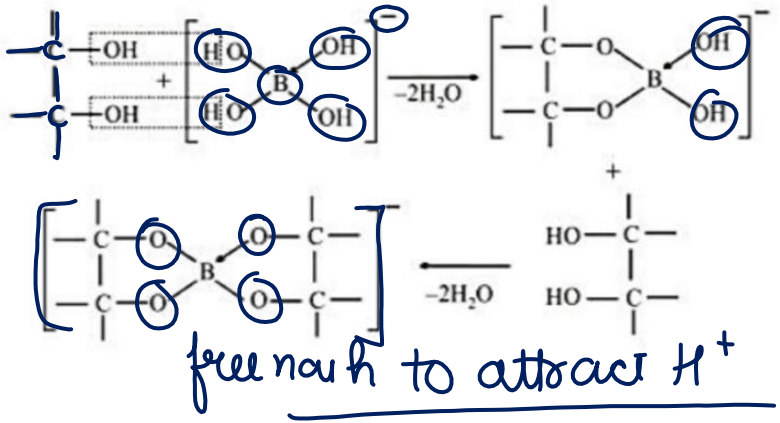
Cis 1, 2 diolnis mixed, due to chelation rxn moves in forward direction.





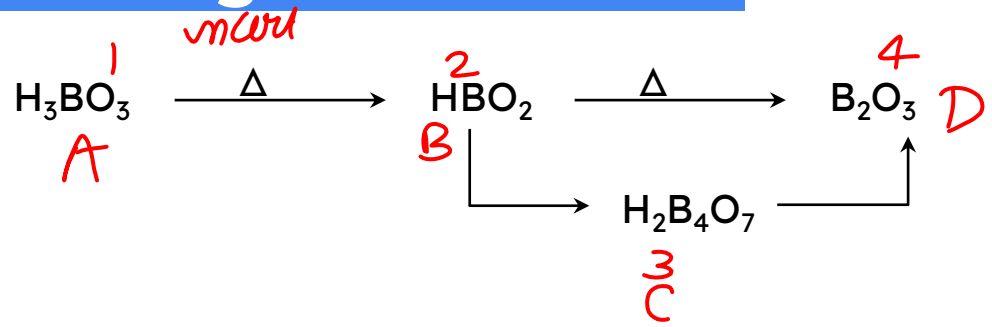
Boric acid

$B(OH)_3 + NaOH \rightleftharpoons Na[B(OH)_4]$



free nauh to attract H^+

Heating of Boric Acid



H_3BO_3

$-H_2O$

HBO_2 ×4

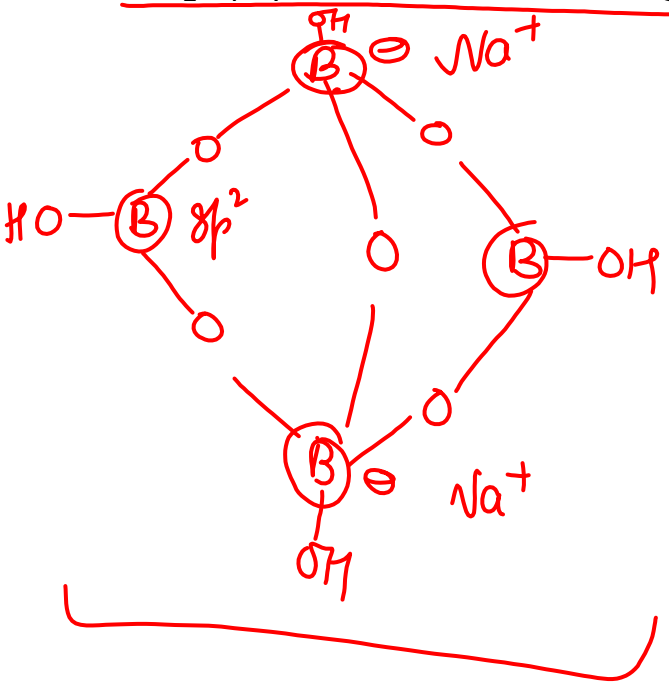
$H_4B_4O_8$

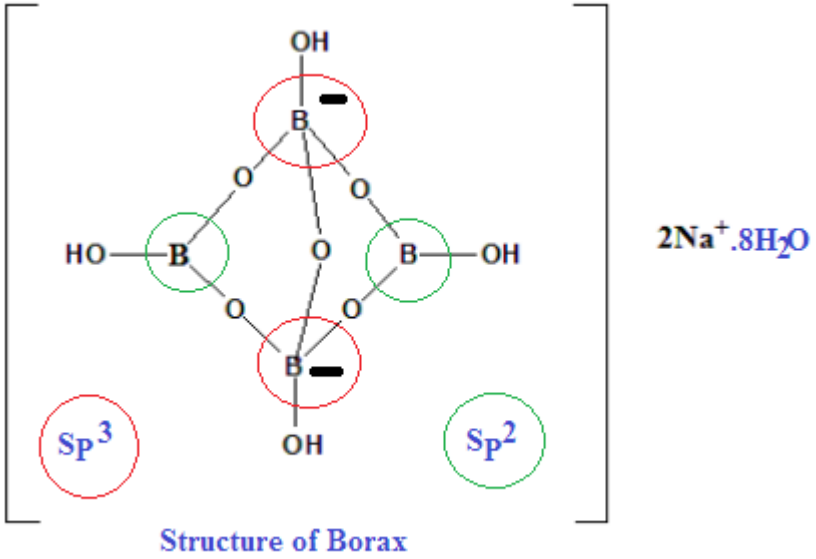
$-H_2O$

$H_2B_4O_7 \xrightarrow{+\Delta} -H_2O + B_2O_3$

Borax $Na_2B_4O_7.10H_2O$ or Tincal :

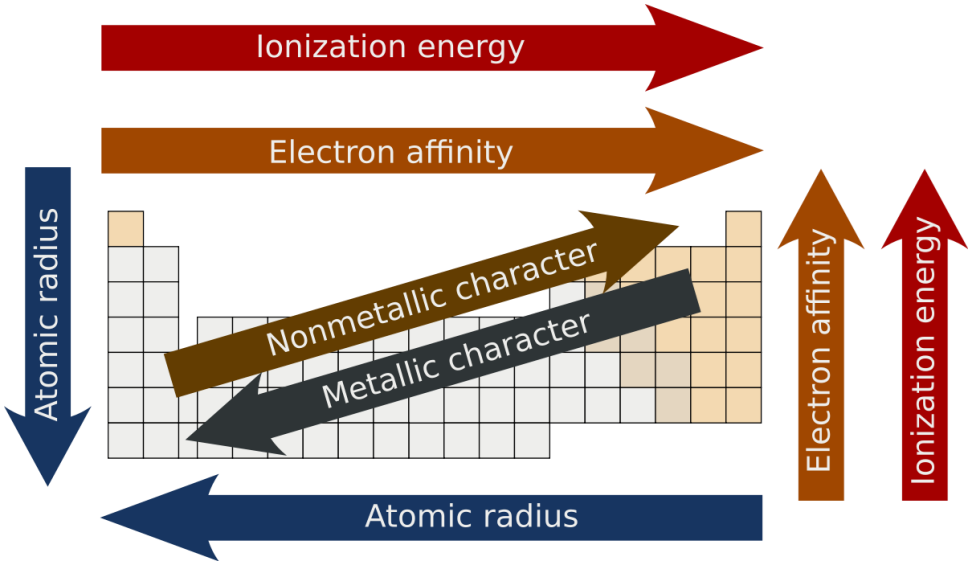
A. It is also named as sodium tetraborate decahydrate.
B. Common Indian name is Suhaga.
C. $Na_2B_4O_7$ is known as boron glass



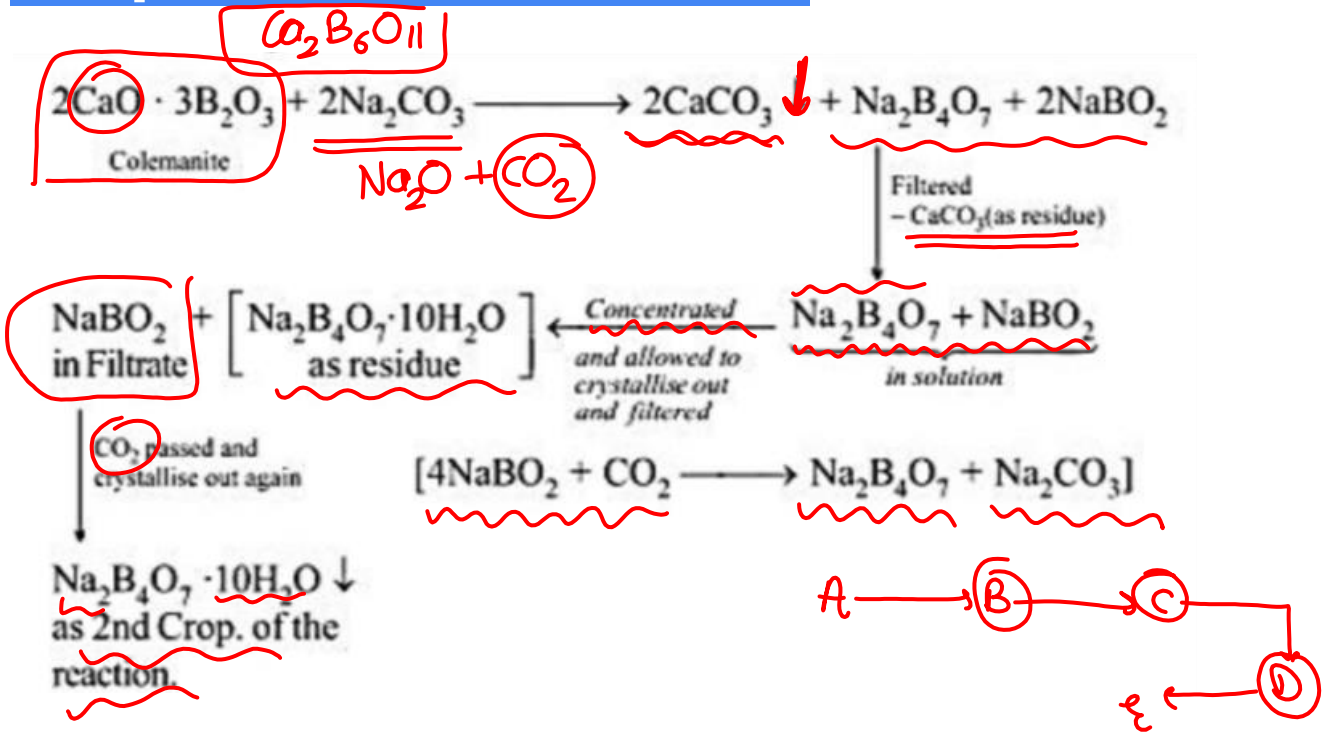


Structure of Borax

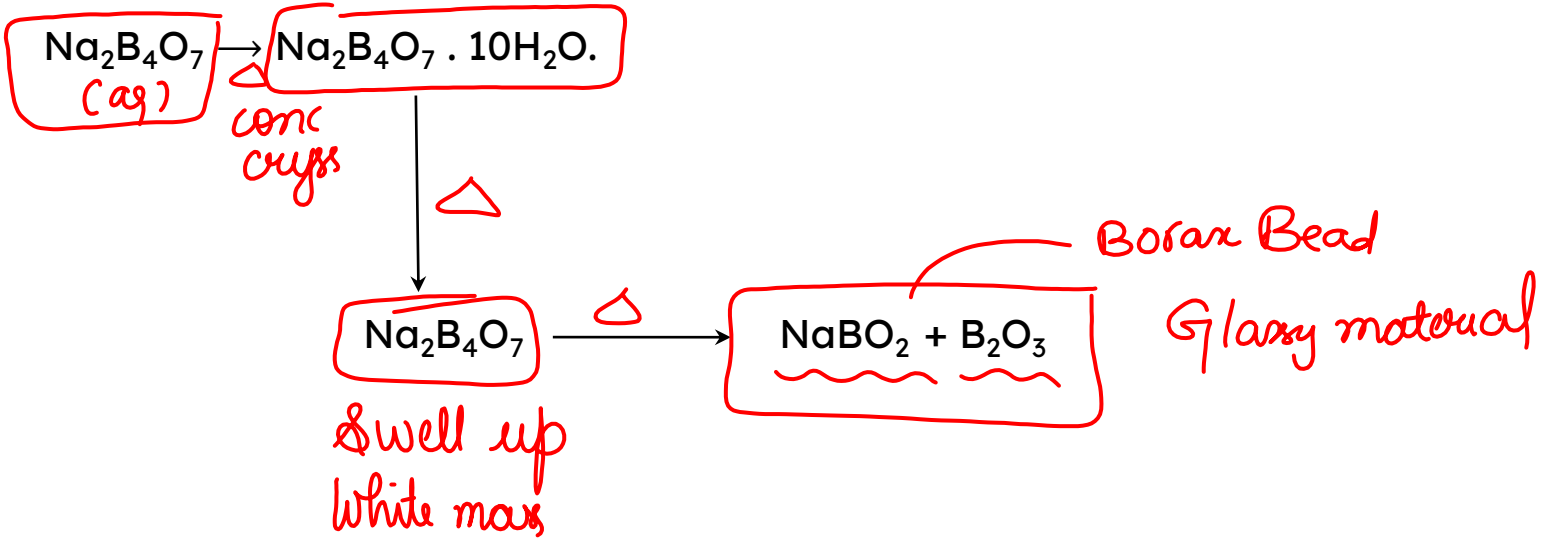
Borax


Ionization energy
Electron affinity
Atomic radius
Nonmetallic character
Metallic character
Electron affinity
Ionization energy
Atomic radius

Preparation From Colemanite : Preparation of Borax :



Heating of Borax



Borax Bead test :

$$Na_2B_4O_7 \xrightarrow{\Delta} Na_2BO_2 + B_2O_3$$

$$B_2O_3 + CoO \longrightarrow Co(BO_2)_2$$

Coloured compound

This test is used to identify transition metal

Action of Heat on Borax :

(i) Borax swells up on heating

(ii) On heating borax loses water and swells into a white mass which on further heating melts to forms transparent glassy solid called Borax glass and Borax bead.

$$Na_2B_4O_7.10H_2O \xrightarrow{Heat} Na_2B_4O_7 \xrightarrow{740^\circ C} Na_2O + 2B_2O_3.$$

white

(iii) The borax bead is due to the formation of B_2O_3 which when fused with metal salts form corresponding metaborate.

$$B_2O_3 + CuO \rightarrow Cu(BO_2)_2$$

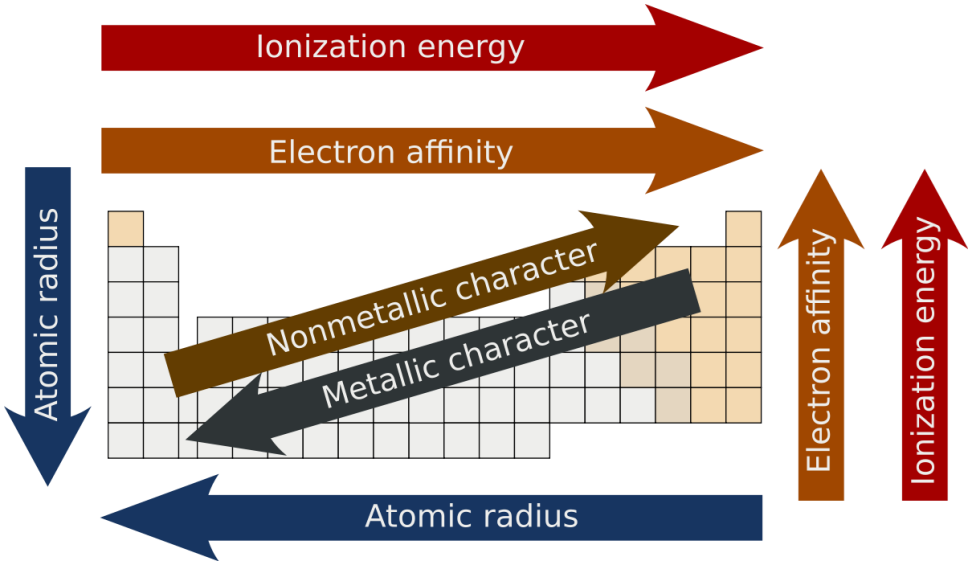
Copper meta borate (Blue)

Action of Heat on Borax :

Colour of meta borates

Cu	Fe	Co	Ni	Cr
Blue	Green	Blue	Brown	Green

Compounds of Aluminium



Aluminium oxide

Al_2O_3 also called alumina or corundum

Bauxite + NaOH $\longrightarrow$ $NaAlO_2$

$NaAlO_2 + CO_2 \longrightarrow Al(OH)_3 + Na_2CO_3$

$Al(OH)_3$ (aq) $\longrightarrow$ Al_2O_3

Aluminium Chloride

Al_2O_3 also called alumina or corundum

$Al + Cl_2 \longrightarrow AlCl_3$

$Al(OH)_3 + HCl \longrightarrow AlCl_3(aq) + \text{dry } HCl \longrightarrow AlCl_3(s)$

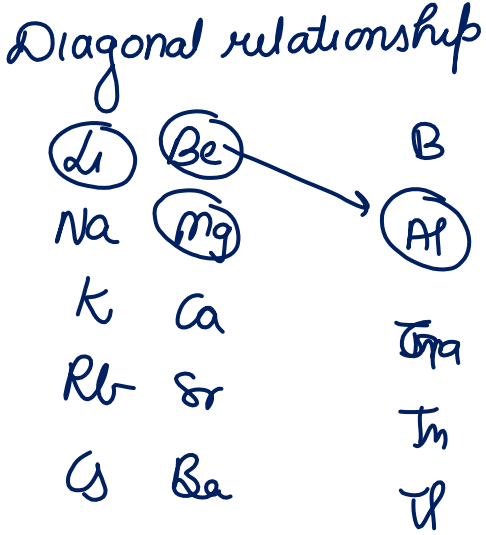
The electronegativity of aluminium is similar to :

A. Carbon

B. Beryllium

C. Boron

D. Lithium



[Jan. 10, 2019 (II)]

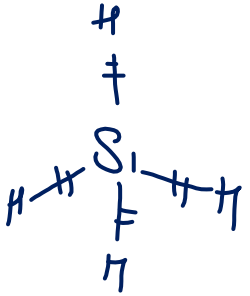
The hydride that is NOT electron deficient is :

A. SiH_4 $8e^-$

B. B_2H_6 → BH_3 e- def

C. GaH_3 → e- def

D. AlH_3 → e- def



[Jan. 11, 2019 (II)]

e-rich. e- def. e- prec

The increasing order of atomic radii of the following Group 13 elements is

A. Al < Ga < In < Tl

B. Ga < Al < In < Tl

C. Al < In < Ga < Tl

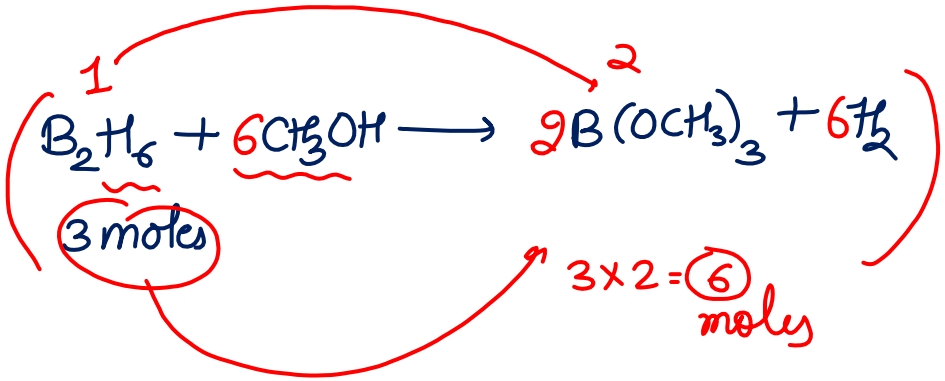
D. Al < Ga < Tl < In

[Adv. 2016]

B < Al > Ga < In < Tl

B < Ga < Al < In < Tl

Three moles of B_2H_6 are completely reacted with methanol. The number of moles of boron containing product formed is



mole concept + group 13

[Adv. 2015]

6

The reaction of $H_3N_3B_3Cl_3$(A) with $LiBH_4$ in tetrahydrofuran gives inorganic benzene (B). Further, the reaction of (A) with (C) leads to $H_3N_3B_3(Me)_3$. Compounds (B) and (C) respectively, are :

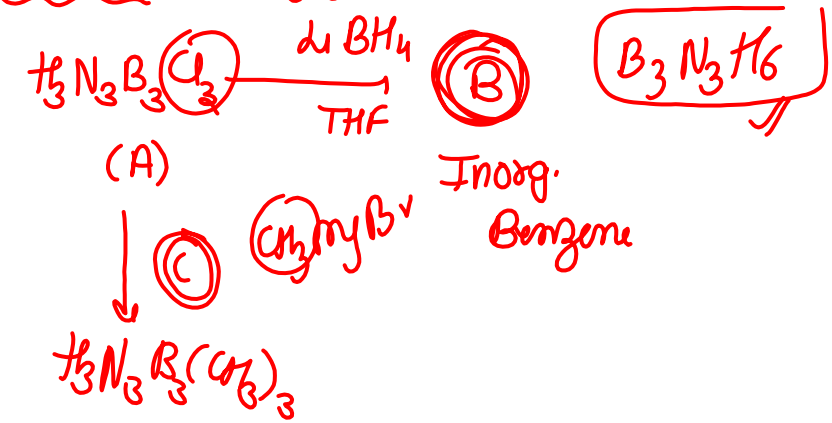
A. Borazine and MeBr

B. Diborane and MeMgBr

C. Boron nitride and MeBr

D. Borazine and MeMgBr

[Jan. 09, 2020 (II)]



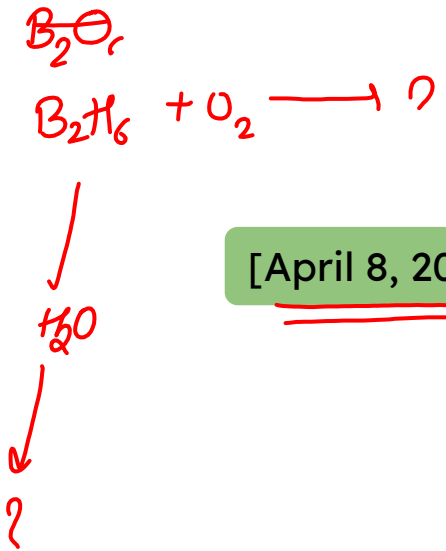
Diborane (B_2H_6) reacts independently with O_2 and H_2O to produce, respectively;

A. B_2O_3 and H_3BO_3

B. B_2O_3 and $[BH_4]^-$

C. H_3BO_3 and B_2O_3

D. HBO_2 and H_3BO_3



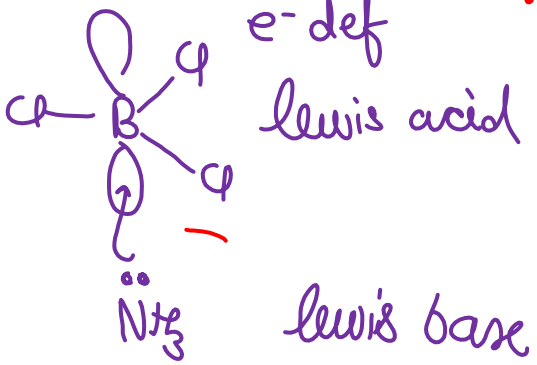
A group 13 element 'X' reacts with chlorine gas to produce a compound XCl_3, XCl_3 is electron deficient and easily reacts with NH_3 to form $Cl_3X \leftarrow NH_3$ adduct, however, XCl_3 does not dimerize. X is :

A. B
B. Al
C. In
D. Ga

BCl_3 B
$AlCl_3$ Al
$InCl_3$ Ga, In
$GaCl_3$ Tl

$X + Cl_2(g) \longrightarrow XCl_3$ (e-def) → doesn't dimerize

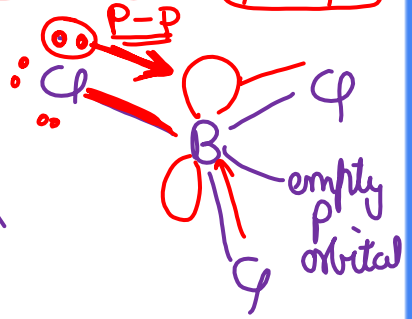
$XCl_3 \xrightarrow{NH_3} Cl_3X \leftarrow NH_3$



Back Bonding

[April 16, 2018]

pπ-pπ



When metal ‘M’ is treated with NaOH, a white gelatinous precipitate ‘X’ is obtained, which is soluble in excess of NaOH. Compound ‘X’ when heated strongly gives an oxide which is used in chromatography as an adsorbent. The metal ‘M’ is :

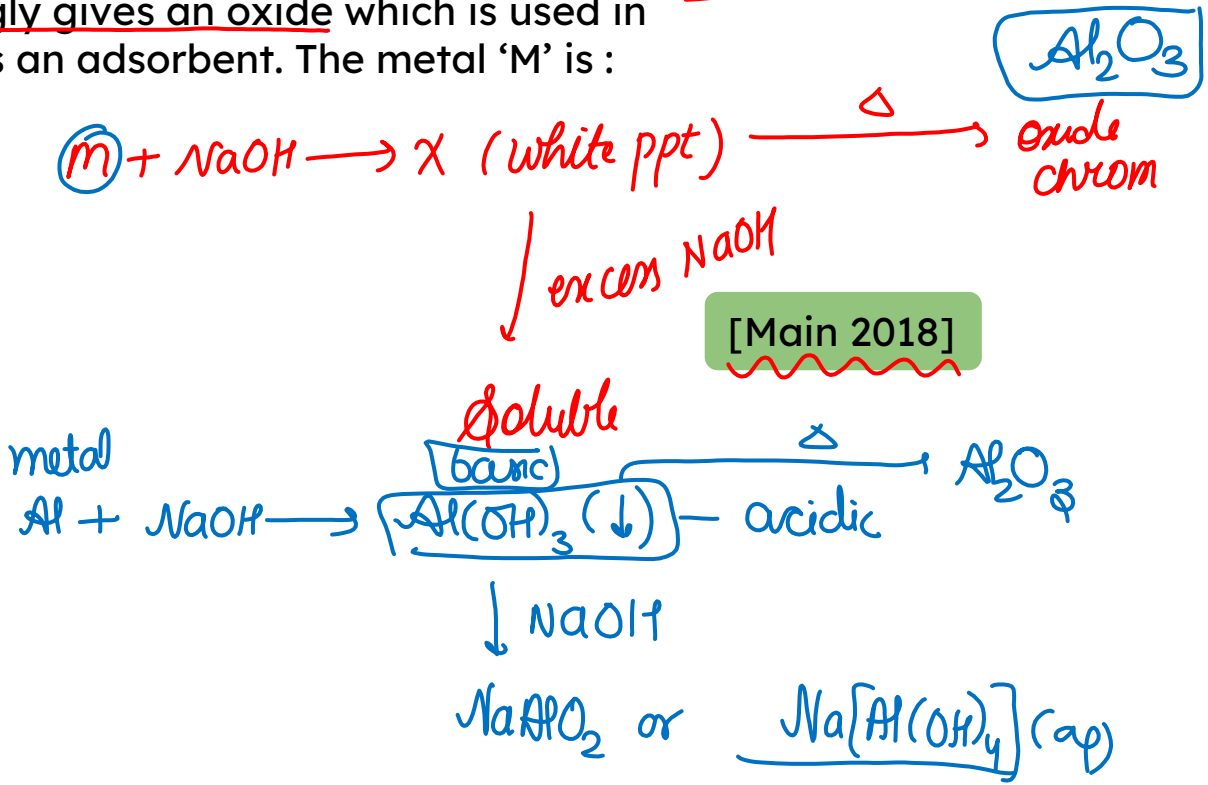
A. Zn

B. Ca

C. Al

D. Fe

[Main 2018]



Identify the reaction which does not liberate hydrogen :

A. Reaction of lithium hydride with B_2H_6.

B. Electrolysis of acidified water using Pt electrodes

C. Reaction of zinc with aqueous alkali

D. Allowing a solution of sodium in liquid ammonia to stand

[April 10, 2016]

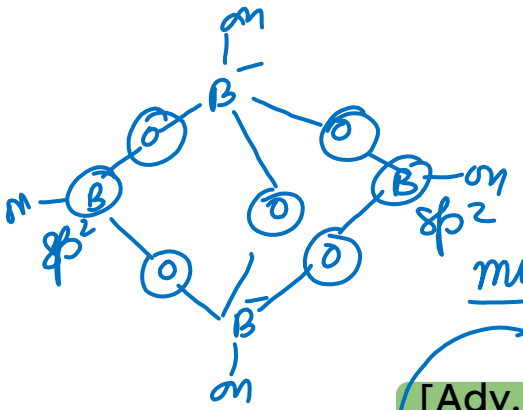
The crystalline form of borax has

A. Tetranuclear $[B_4O_5(OH)_4]^{2-}$ unit

B. All boron atoms in the same plane

C. Equal number of sp^2 and sp^3 hybridized boron atoms

D. One terminal hydroxide per boron atom.



multicorrect

[Adv. 2016]

acd

The correct statement(s) for orthoboric acid is/are

A. It behaves as a weak acid in water due to self ionization.

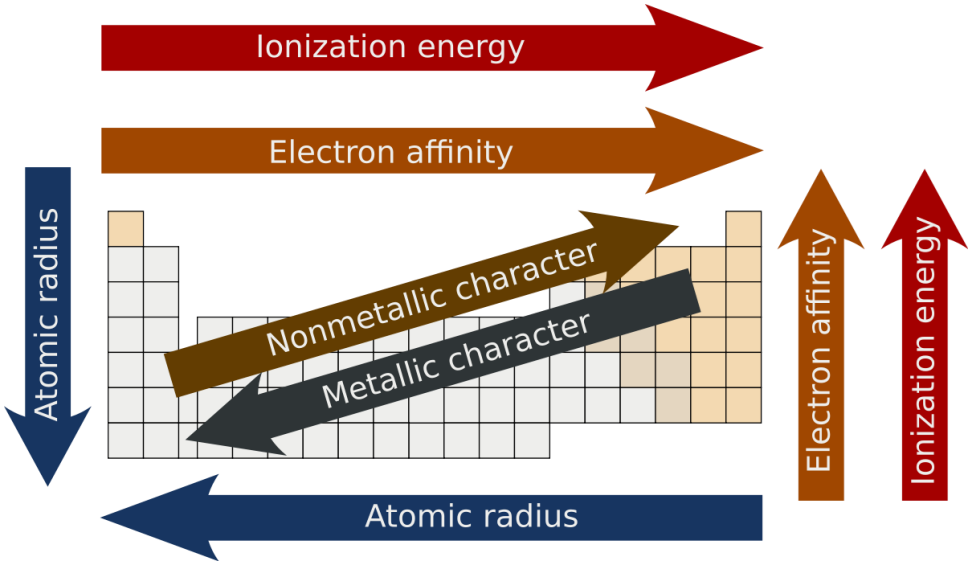
B. Acidity of its aqueous solution increases upon addition of ethylene glycol

C. It has a three dimensional structure due to hydrogen bonding

D. It is a weak electrolyte is water

[Adv. 2014]

Group 14


Ionization energy
Electron affinity
Atomic radius
Nonmetallic character
Metallic character
Electron affinity
Ionization energy
Atomic radius

The carbon family

C Si — Nonmetal

Ge — Metalloid

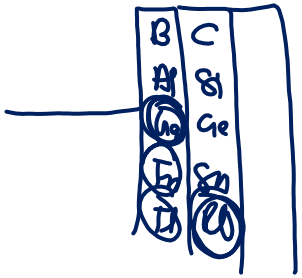
Sn Pb — Metals

Atomic Radius

IE

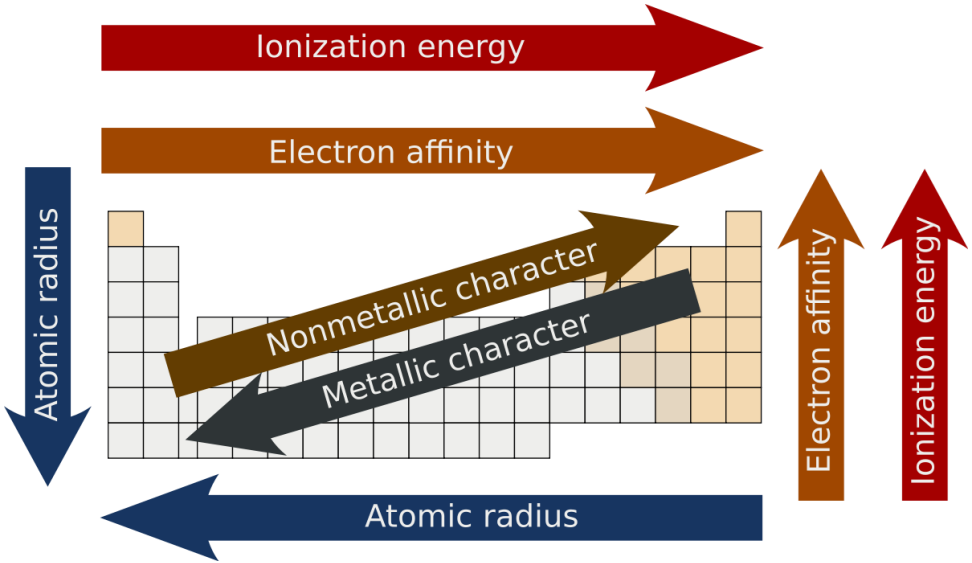
C < Si < Ge < Sn < Pb (atomic rad)

C > Si > Ge > Sn < Pb // 4f e⁻ poor shielding



Final order : C > Si > Ge > Pb > Sn

Variations in group 14



Trends in atomic radius & IE

Atomic Radius C < Si < Ge < Sn < Pb

Ionization energy C > Si > Ge > Sn < Pb

Final order :C > Si > Ge > Pb > Sn

4f e⁻

Electronegativity & MP :

Eneg

C > Si ≈ Ge ≈ Sn < Pb

4f e⁻

C > Pb > Si ≈ Ge ≈ Sn

Melting point:

C > Si > Ge > Pb > Sn

Zeff ↑

m-m int ↑

C

Si

Ge

Sn

Pb

Allotropes of C :

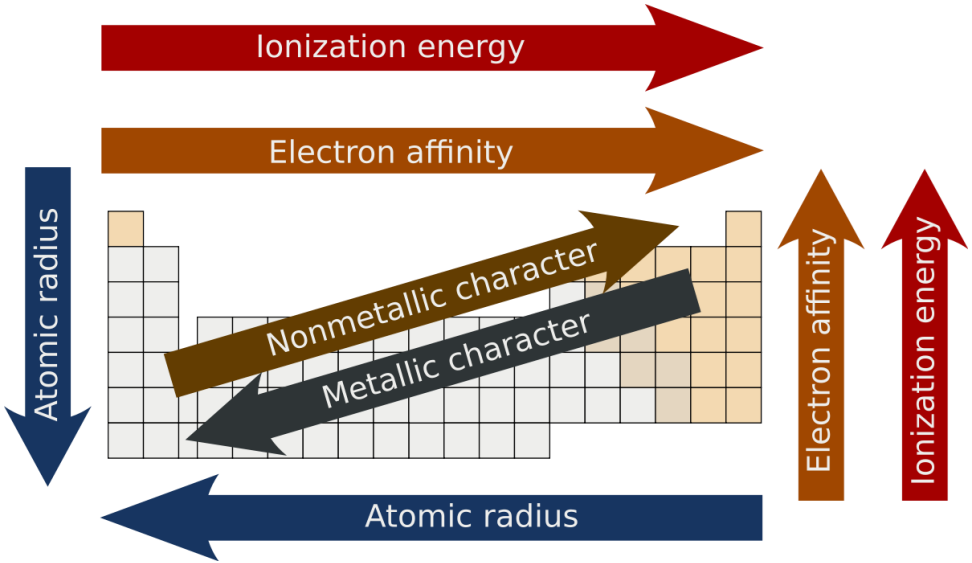
Crystalline

- Diamond
- Graphite
- Fullerene

Amorphous

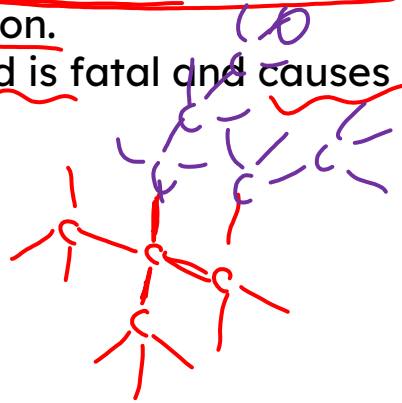
- Coke , C-Block , Charcoal
- Activated charcoal

Allotropes of Carbon



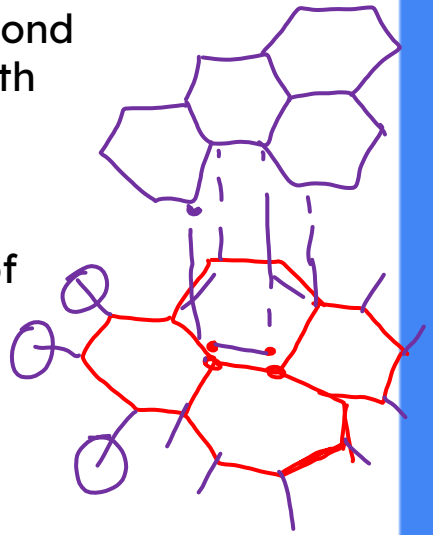
Diamond

1. Each carbon is linked to another atom and so very closed packing in structure of Diamond.
2. Density and hardness is very much greater for diamond because of closed packing in diamond due to sp^3 hybrid and are tetrahedrally arranged around it.
3. Diamond has sharp cutting edges that's why it is employed in cutting of glass.
4. Diamond crystals are non conductor of electricity because of not presence of mobile electron.
5. Diamond powder if consumed is fatal and causes death in minutes.



Graphite :

1. In graphite carbon are sp^2 hybridised and due to this carbon exist as hexagonal layer.
2. Each carbon is lined with 3 carbons and one carbon will be left and form a two dimensional shed like structure.
3. Distance between two layers is very large so no regular bond is formed between two layers. The layers are attached with weak vanderwaal force of attraction.
4. The carbon have unpaired electron so graphite is a good conductor of current.
5. C-C bond length in Graphite is shorter (1.42 Å) than that of Diamond (1.54 Å).
6. Graphite has high melting point so it is employed in manufacture of crucible.



Thermodynamic stability:

Graphite > Diamond > Fullerene

Fullerene → **Pure form**

C_n

Molecular sold

Absence of Dangling valency

C_n general formula,

12 → 5 membered ring

Sp^2

n/2 -10 → 6 membered ring

C_{60}

$\frac{n}{2} - 10$

C_{60}

$\frac{60}{2} - 10$

$30 - 10 = 20$

main ju

C_{60} 12 → 5 memb

20 → 6 memb.

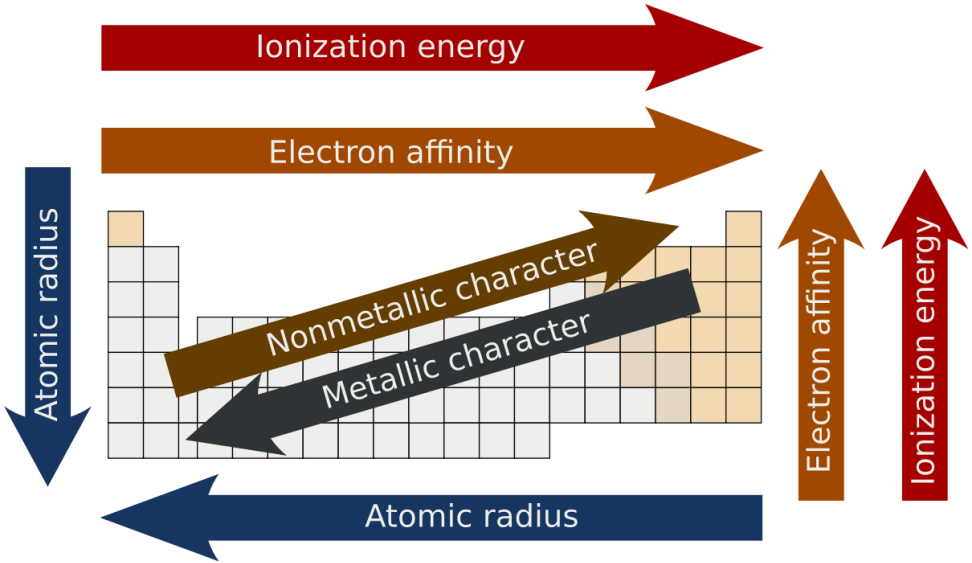
C_{70} 12 – 5 mem.

25 – 6 mem

$\frac{70}{2} - 10$

35 – 10

Compounds of Carbon



Oxidation state :

Down the group, stability of +2 OS inc and stability of +4 as dec

- $Pb^{2+} > Pb^{+4}$
- $Sn^{2+} < Sn^{+4}$

general e conf

$ns^2 np^2$ → +4

+4 C — $2s^2 2p^2$

+4 Si → $3s^2 3p^2$

+4, +2 Ge → $3d^{10} 4s^2 4p^2$

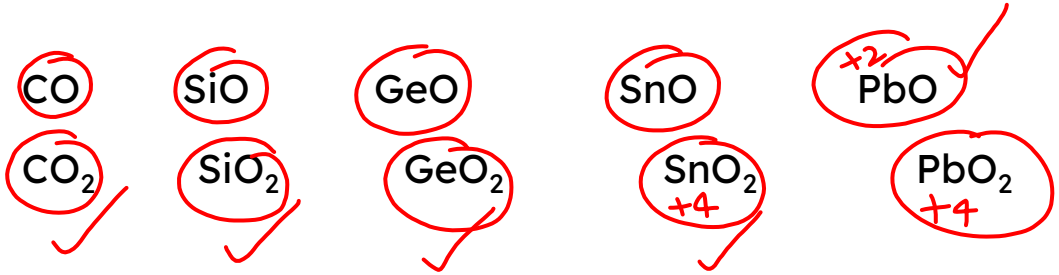
+4, +2 Sn — $3d^{10} 4d^{10} 4p^6 5s^2 5p^2$

+2 Pb → $4f^{14} 5s^2 5p^6 5d^{10} 6s^2 6p^2$

$Pb^{+2} > Pb^{+4}$

Oxides of group 14

They form MO & MO_2 types of oxides on reaction / heating with air



$E + O_2 \rightarrow EO$

EO_2

Halides :

Stability $GeX_2 < SnX_2 < PbX_2$

Stability $F^- > Cl^- > Br^- > I$

except SnF_4 & PbF_4 all tetra halides are covalent

Reactivity towards water :

C / Si / Ge ⟶ No reaction

(Network solids)

$Pb + H_2O \longrightarrow$ No reaction

Due to formation of protective layer of oxide

$Sn + steam \longrightarrow SnO_2 + H_2 \uparrow$

Catenation tendency :

α single bond energy

C > Si > Ge ≈ Sn > Pb

(no catenation because of metallic nature).

3p-3p

2p – 2p

2p–2p strong

Oxides of C :

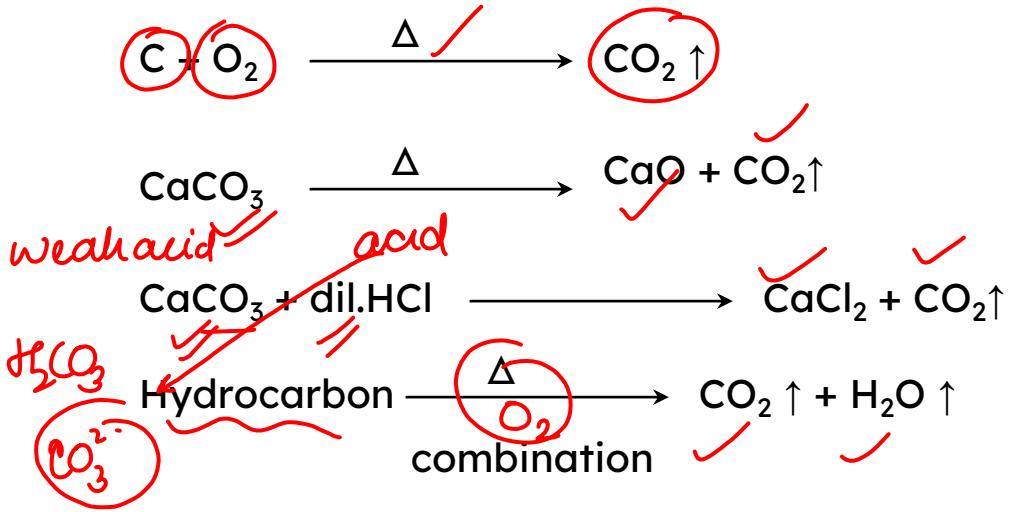
C + limited air $\longrightarrow$ $CO\uparrow$ + Hb $\longrightarrow$

$HCOOH \xrightarrow{\text{Conc. } H_2SO_4} CO\uparrow$

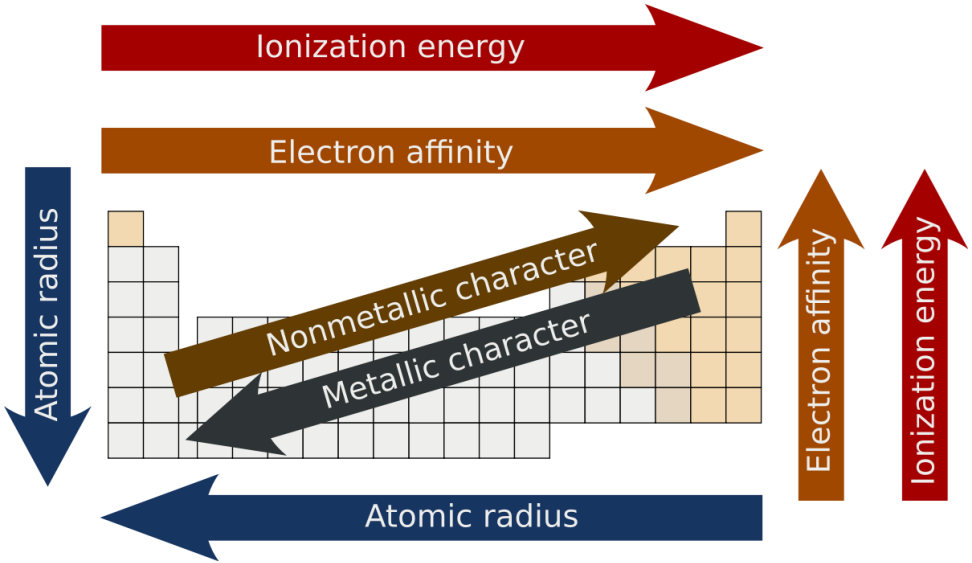
$C_{(s)}$ + steam $\xrightarrow{\Delta}$ $CO\uparrow + H_2\uparrow$ — syn gas

$C_{(s)}$ + air $\xrightarrow{\Delta}$ $CO\uparrow + N_2\uparrow$ — Producton gas

Oxides of C :


C + O2
Δ
CO2 ↑
CaCO3
Δ
CaO + CO2↑
weak acid
acid
CaCO3 + dil.HCl
CaCl2 + CO2↑
H2CO3
CO3 2-
Hydrocarbon
Δ
O2
CO2 ↑ + H2O ↑
combination

Compounds of Si



Silicon dioxide

Silicon dioxide

SiO_2

silica

pure silica colourless

Silica (sand) ⟶ Brown coloured due to presence of ferric oxide

Fe_2O_3

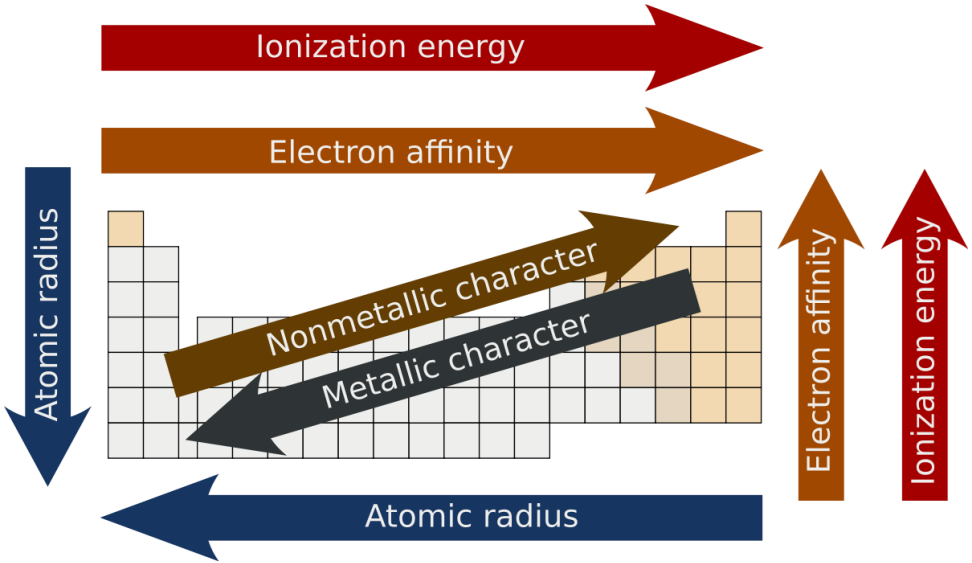
Silicon dioxide

It also dissolves in NaOH.

$NaOH + SiO_2 \rightarrow Na_2SiO_3 + H_2O$

SiO_2 + halogen / H_2O / air / acid $\rightarrow$ x

Silicates


Ionization energy
Electron affinity
Atomic radius
Nonmetallic character
Metallic character
Electron affinity
Ionization energy
Atomic radius

Overall formula:

$$Si_1O^{-b}_{a/2+b}$$

a = no. of divalent oxygens

b = no. of monovalent oxygens

(Charge will be because of monovalent oxygens)

$$SiO^{b-}_{\frac{a}{2}+b}$$

Types of silicates

Ortho pyro single chain 2D 3D

OR

cyclic

O P S 2 3

cyclic

Ops ! 23

is a bad number.

	Ortho	Pyro	Single chain	2D	3D
Shared 'O'	0	1	2	3	4
Unshared 'O'	4	3	2	1	0
Formula	SiO_4^{4-}	$SiO_{1/2+3}^{-3}$	$SiO_{2/2+2}^{2-}$	$SiO_{3/2+1}^{-}$	$SiO_{4/2}^{0}$

$SiO_{\frac{a+b}{2}}^{b-}$

SiO_4^{4-}

$SiO_{\frac{1}{2}+3}^{3-}$

Zeolites (truncated octahedral) :

ALUMINOSILICATES

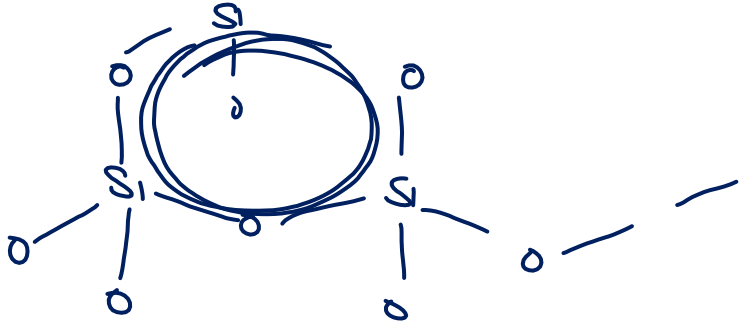
Water absorber

Purifier

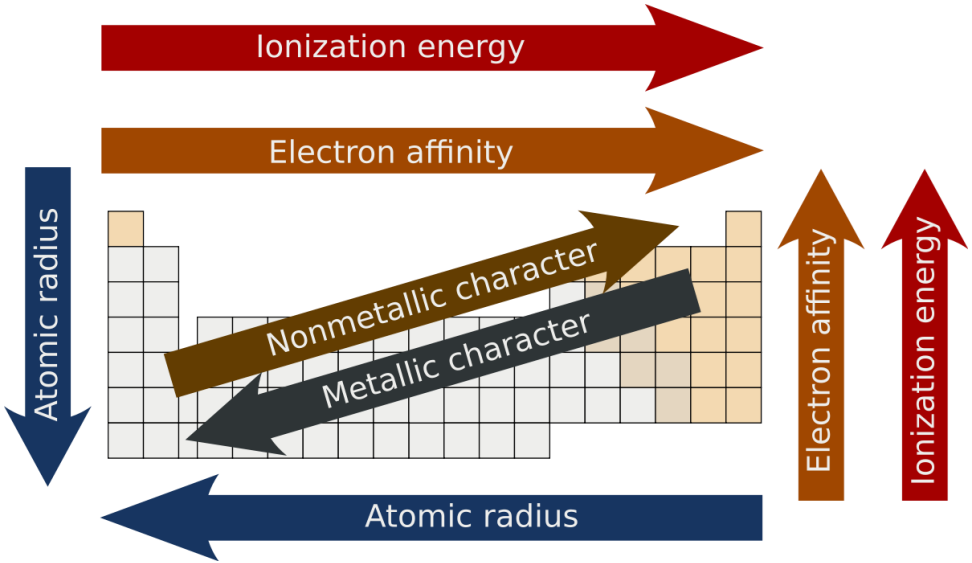
Catalyst ex ZSM - 5 (porosity)

(used in petroleum refining)

Converts ROH ⟶ gasoline

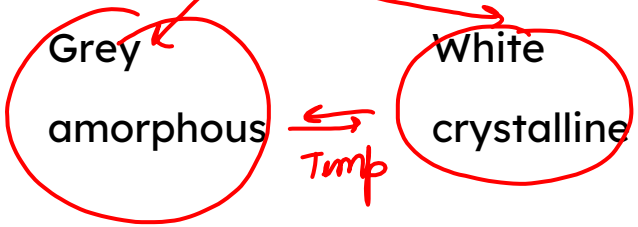


Tin and its compounds



Tin & its compound :

Sn ⟶ allotropic form



Reactions of Tin

Tin reacts with both dilute and concentrated acids because reactivity of Sn > H

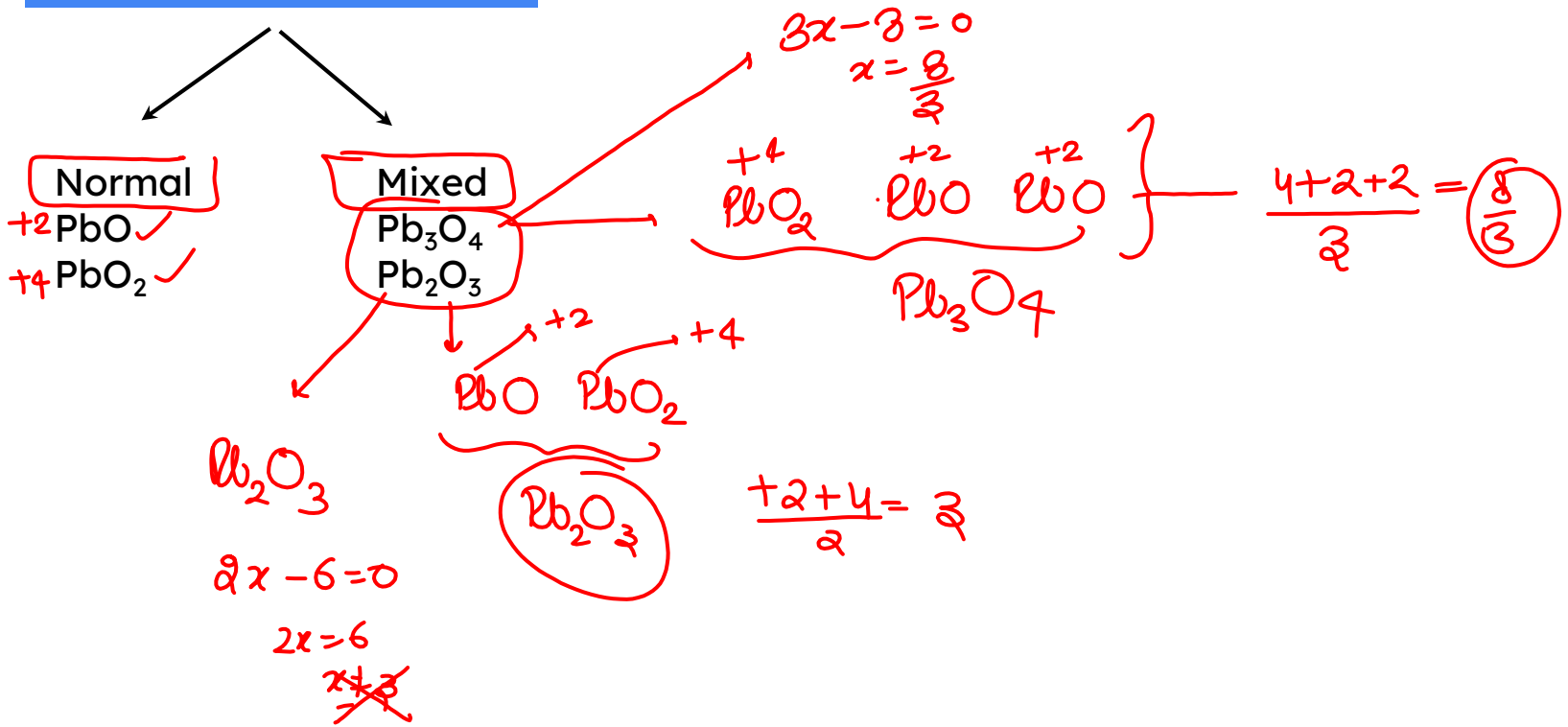
Sn + acid (dil/con) ⟶

Sn + NaOH ⟶

Since Sn is amphoteric ∴ it can reach with NaOH also

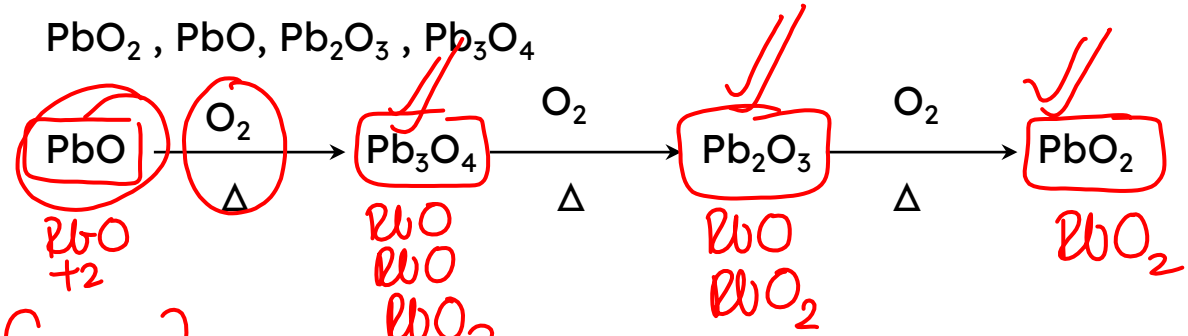
p-block.

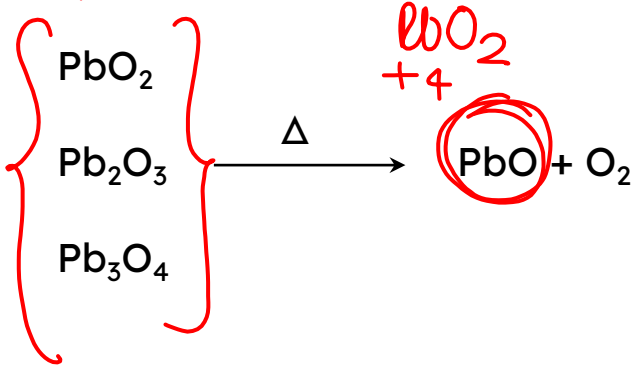
Oxides of Lead



Oxides of Lead

PbO_2 , PbO, Pb_2O_3 , Pb_3O_4





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Oxides of Lead

Both PbO and PbO_2 are amphoteric

But PbO is predominately basic where as PbO_2 is predominately acidic

PbO + conc./dil H_2SO_4 → $PbSO_4$ (ppt)

PbO + conc./dil HNO_3 → $Pb(NO_3)_2$ (aq)

PbO + conc./dil HCl → $PbCl_2$ (↓)

Oxides of Lead

PbO_2 + dil H_2SO_4	→	no reaction
PbO_2 + conc H_2SO_4	→	$PbSO_4$ (ppt) + O_2
PbO_2 + dil HNO_3	→	no reaction
PbO_2 + conc HNO_3	→	$Pb(NO_3)_2$ + O_2
PbO_2 + dil HCl	→	$PbCl_2$ + Cl_2
PbO_2 + conc HCl	→	$PbCl_2$ + Cl_2

The correct statement among the following is :

A. $(SiH_3)_3N$ is planar and less basic than $(CH_3)_3N$.

B. $(SiH_3)_3N$ is pyramidal and more basic than $(CH_3)_3N$.

C. $(SiH_3)_3N$ is pyramidal and less basic than $(CH_3)_3N$.

D. $(SiH_3)_3N$ is planar and more basic than $(CH_3)_3N$.

[April 12, 2019 (I)]

The C - C bond length is maximum in :

A. graphite sp^2

B. C_{70} } =, −, =, −

C. C_{60} } =, −, =, −

D. diamond } all −

[April 12, 2019 (II)]

The correct order of catenation is :

A. C > Sn > Si ≈ Ge

B. C > Si > Ge ≈ Sn

C. Si > Sn > C > Ge

D. Ge > Sn > Si > C

[April 12, 2019 (II)]

The element that does NOT show catenation is :

A. Ge

B. Si

C. Sn

D. Pb

[April 12, 2019 (II)]

The chloride that CANNOT get hydrolysed is:

A. $PbCl_4$

B. CCl_4

C. $SnCl_4$

D. $SiCl_4$

[April 12, 2019 (II)]

Which of the following are Lewis acids ?

A. PH_3 and BCl_3

B. $AlCl_3$ and $SiCl_4$

C. PH_3 and $SiCl_4$

D. BCl_3 and $AlCl_3$

The best

vacant d-obb

[Main. 2018]

Choose the correct statement(s) among the following.

A. $SnCl_2.2H_2O$ is a reducing agent.

B. SnO_2 reacts with KOH to form $K_2[Sn(OH)_6]$.

C. A solution of $PbCl_2$ in HCl contains Pb^{2+} and Cl^- ions.

D. The reaction of Pb_3O_4 with hot dilute nitric acid to give PbO_2 is a redox reaction.

[Adv. 2020]

A tin chloride Q undergoes the following reactions (not balanced)

$Q + Cl^- \longrightarrow X$

$Q + Me_3N \longrightarrow Y$

$Q + CuCl_2 \longrightarrow Z + CuCl$

X is a mono anion having pyramidal geometry. Both Y and Z are neutral compounds. Choose the correct options(s).

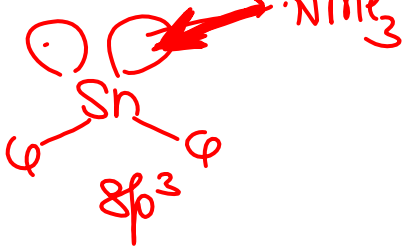
[Adv. 2019]

A. The oxidation state of the central atom in Z is +2

B. The central atom in Z has one lone pair of electrons

C. The central atom in X is sp^3 hybridized

D. There is a coordinate bond in Y



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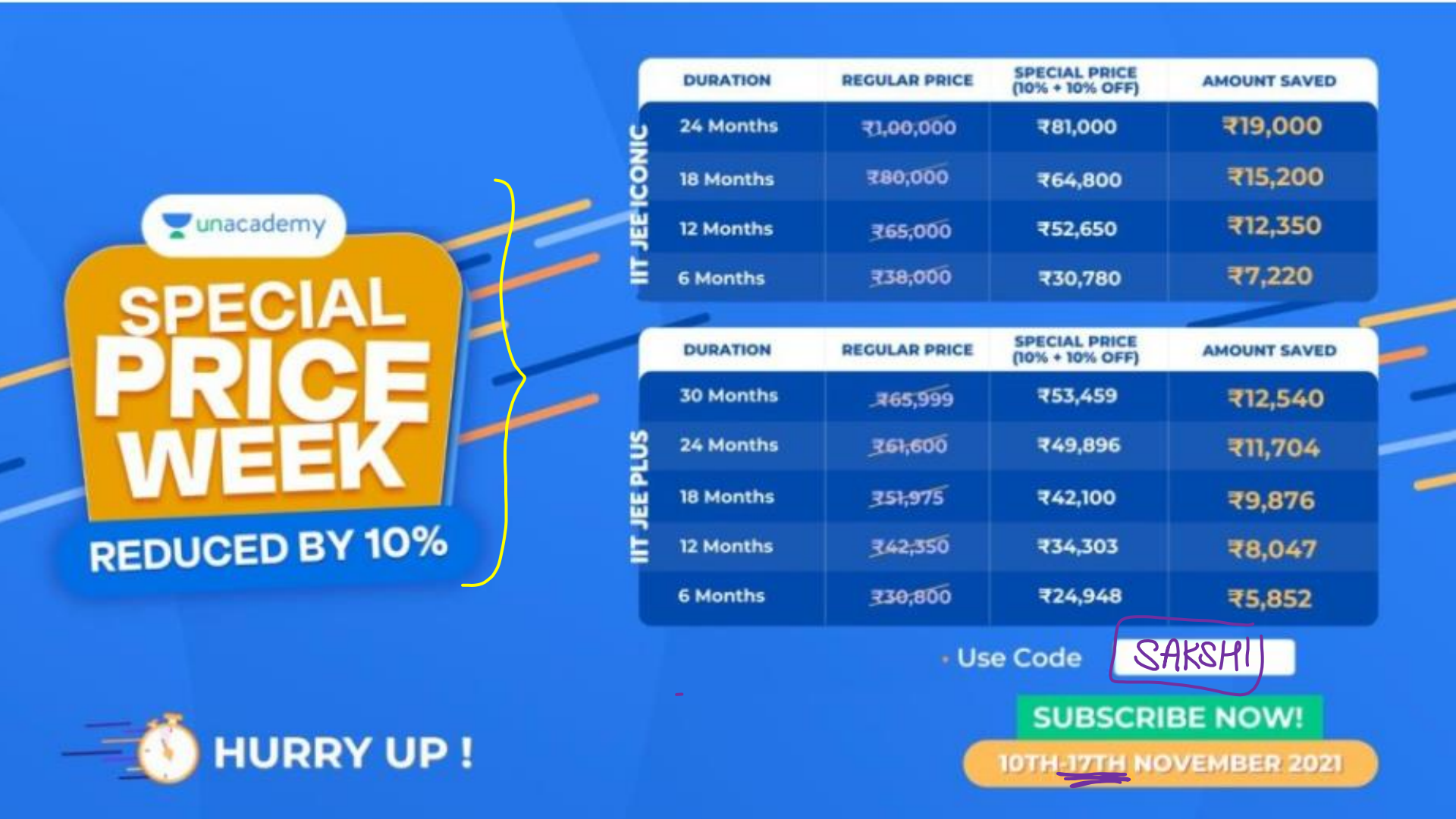
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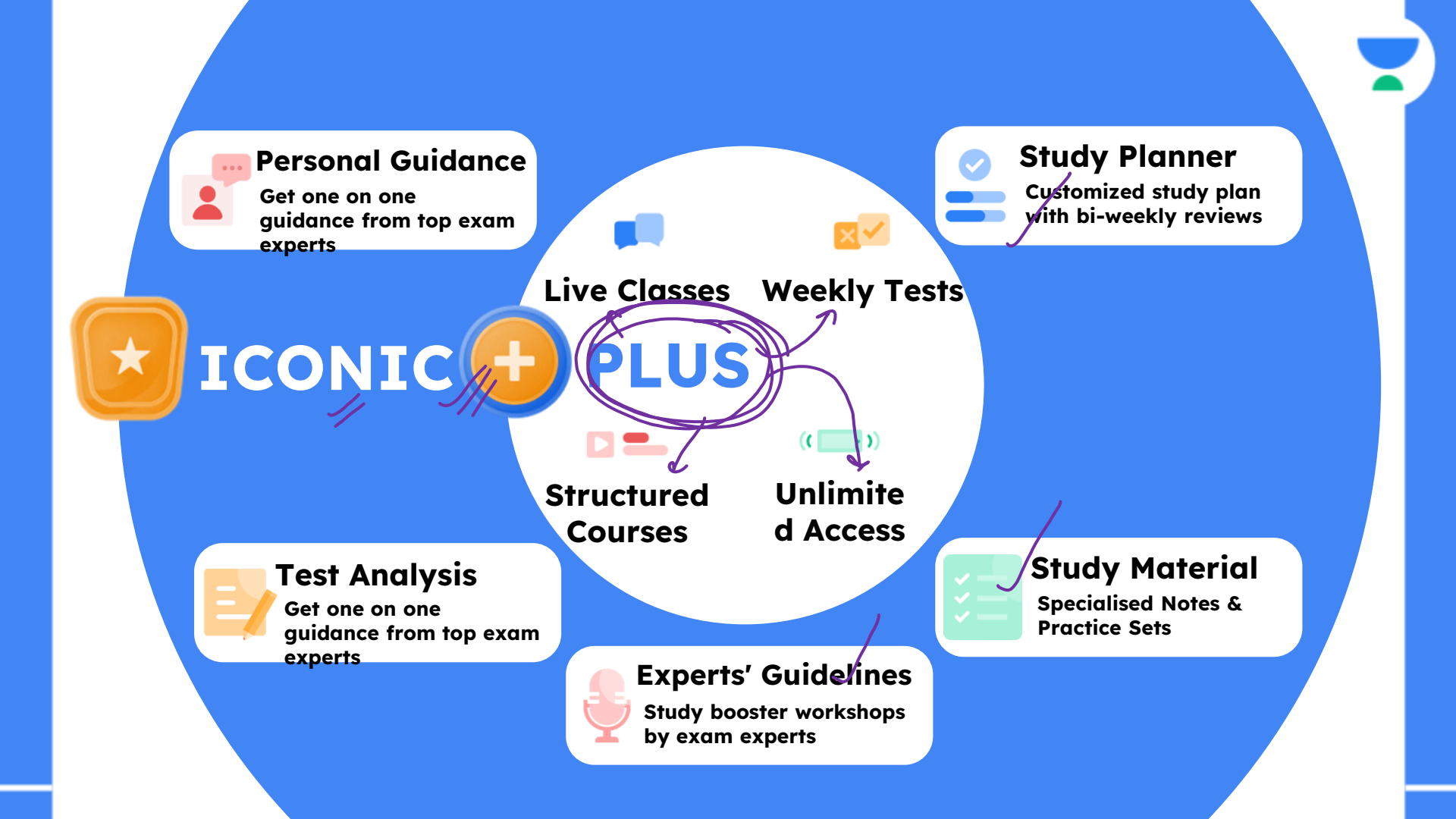
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1-10	₹20,000	100%
11-30	₹10,000	50%
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50-200	--	15%

FINALS - Prizes & Scholarships

RANK	PRIZES EACH	SCHOLARSHIP %
1	₹1,00,000	100%
2 & 3	₹60,000	100%
4-10	₹5,000	100%
11-30	--	50%
31-50	--	25%
51-200	--	15%

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