

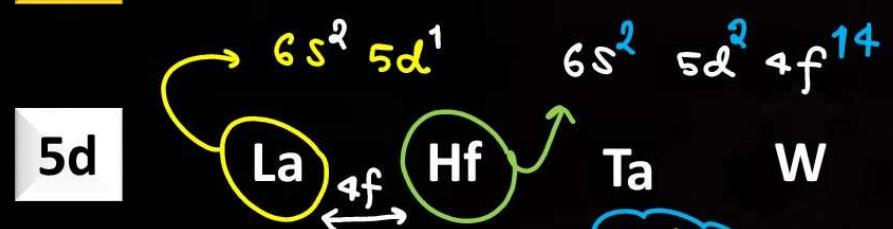
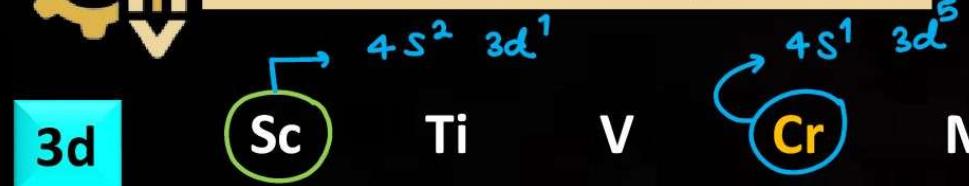
Periodic Table

The periodic table is shown with several handwritten annotations:

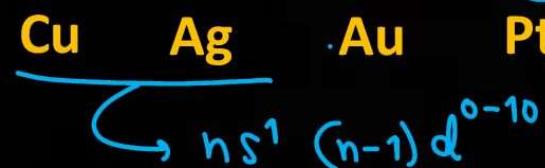
- Top Left:** A yellow box highlights the first two groups (H, Li, Be, Na, Mg). A blue arrow labeled "3rd group" points from the third column (Sc, Ti, V) to the fourth column (Cr, Mn, Fe).
- Top Center:** Handwritten arrows show electron transitions between Sc (21) and Zn (30), and between La (57) and Hg (85).
- Top Right:** A yellow circle highlights the lanthanide series (Ce-Lu). Another yellow circle highlights the actinide series (Th-Lr). A blue circle highlights the transition metals (Tb-Ho).
- Second Row:** A yellow box highlights the second-period elements (He, Ne, Ar).
- Third Row:** A yellow box highlights the third-period elements (B, C, N, O, F, Ne).
- Fourth Row:** A yellow box highlights the fourth-period elements (Al, Si, P, S, Cl, Ar).
- Fifth Row:** A yellow box highlights the fifth-period elements (Ga, Ge, As, Se, Br, Kr).
- Sixth Row:** A yellow box highlights the sixth-period elements (In, Sn, Sb, Te, I, Xe).
- Seventh Row:** A yellow box highlights the seventh-period elements (Cs, Ba, La, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn).
- Bottom Row:** A yellow box highlights the eighth-period elements (Fr, Ra, Ac, Rf, Db, Sg, Bh, Hs, Mt, Ds, Rg, Uub, Nh, Fl, Mc, Lv, Ts, Og).
- Actinides:** A green box highlights the actinide series (Ce-Pm, Th-Np, Pa-U, Pu-Am, Cm-Bk, Cf-Es, Fm-Md, No-Lr).
- Lanthanides:** A green box highlights the lanthanide series (Ce-Lu).
- Handwritten Labels:** "P" and "W" are written in circles at the top right. "104" is written next to Rf. "103" is written next to Lr. "118" is written next to Og. "54" is written next to Xe. "86" is written next to Rn. "36" is written next to Kr.



Electronic Configuration



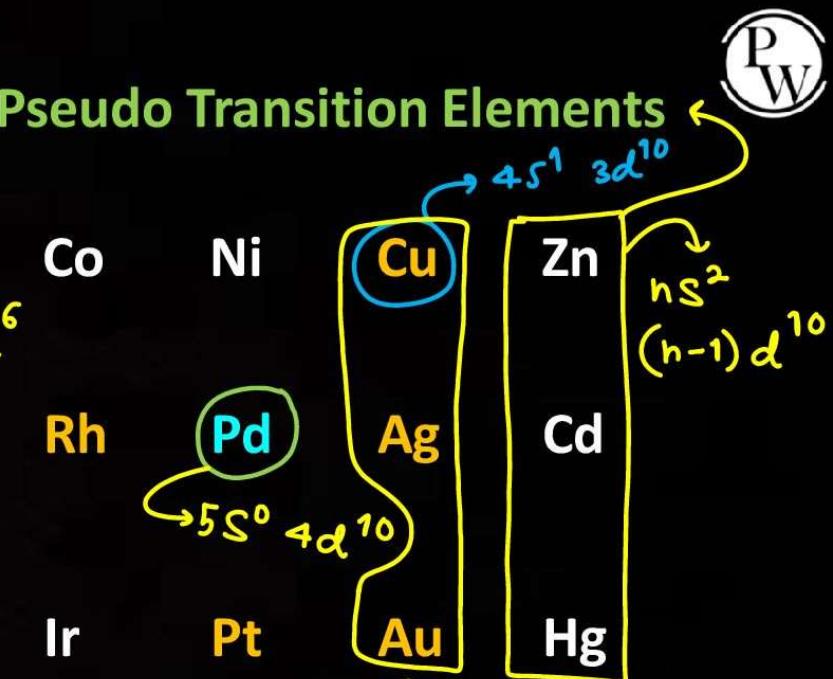
"Jwala OP"



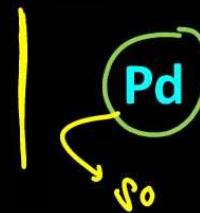
Ni/H₂
Pd/R₂
Pt/R₂

Catalyst for Hydrogenation

Pseudo Transition Elements



Coinage Metals



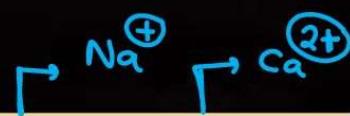
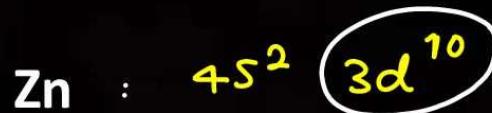
1 st Series										
	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
Z	21	22	23	24	25	26	27	28	29	30
4s	2	2	2	1	2	2	2	2	1	2
3d	1	2	3	5	5	6	7	8	10	10
2 nd Series										
	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd
Z	39	40	41	42	43	44	45	46	47	48
5s	2	2	1	1	1	1	1	0	1	2
4d	1	2	4	5	6	7	8	10	10	10
3 rd Series										
	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg
Z	57	72	73	74	75	76	77	78	79	80
6s	2	2	2	2	2	2	2	1	1	2
5d	1	2	3	4	5	6	7	9	10	10



D-Block Elements

P
W

The elements whose atoms or simple ions contain partially filled d-orbitals.



Variation of Oxidation state

❖ Due to similar energies of ns and $(n - 1)d$ orbitals e-s both can participate to show variable oxidation state.



Stability : $\text{f}_{\text{e}}^{+3} > \text{f}_{\text{e}}^{+2}$

Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
+2	+2	+2	+2	+2	+2	+2	+2	+1	+2
+3	+3	+3	+3	+3	+3	+3	+3	+2	
+4	+4	+4	+4	+4	+4	+4	+4		
	+5	+5	+5						
	+6	+6	+6						
		+7							

Highest Oxidation State
Ru and Os : +8

Most Common Oxidation State : +2

Ni
Pd
Pt

The heavy elements in d – block stable at higher O.S.

Mo(VI) & W(VI) are found more stable than Cr(VI).

Highest Oxidation State : +7 Mn

Cr(+6) < Mo(+6)

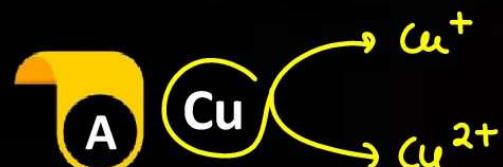
Cr(+6) < W(+6)

Q.

The element that usually **does NOT** show variable oxidation states is :

P
W

[12th Jan 2019 (I)]



Magnetic Property

Paramagnetic (unpaired ✓) Diamagnetic (unpaired ✗)

P
W

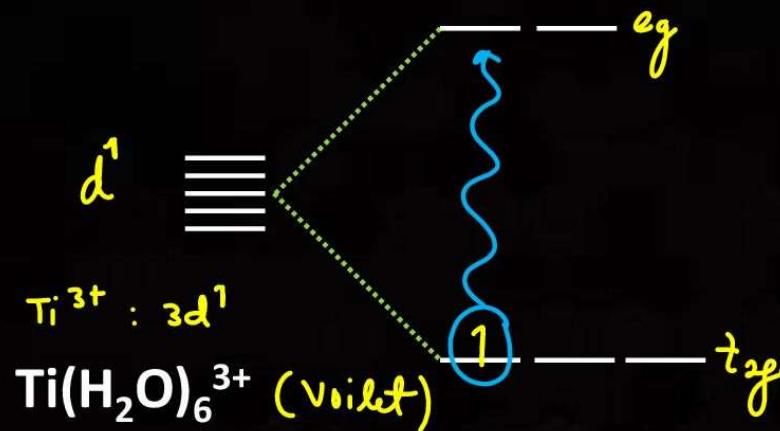
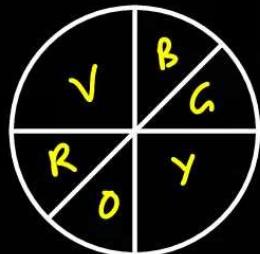
n : No. of unpaired
Magnetic Moment

$$\sqrt{n(n+2)} \text{ BM}$$

Ion	Configuration	Unpaired electron(s)	Magnetic moment	
			Calculated	Observed
Sc ³⁺	3d ⁰	0	0	0
Ti ³⁺	3d ¹	1	1.73	1.75
Tl ²⁺	3d ²	2	2.84	2.76
V ²⁺	3d ³	3	3.87	3.86
Cr ²⁺	3d ⁴	4	4.90	4.80
Mn ²⁺	3d ⁵	5	5.92	5.96
Fe ²⁺	3d ⁶	4	4.90	5.3 – 5.5
Co ²⁺	3d ⁷	3	3.87	4.4 – 5.2
Ni ²⁺	3d ⁸	2	2.84	2.9 – 3.4
Cu ²⁺	3d ⁹	1	1.73	1.8 – 2.2
Zn ²⁺	3d ¹⁰	0	0	



Colour in Co-ordination Compounds



$d - d$ Transition

$t_{2g} \rightarrow eg$

Transition



When light of certain frequency falls on the complex, it absorbs light from visible range for transition of electrons from lower d-energy level to higher d energy level. This transition is called **d-d transition of electron**.

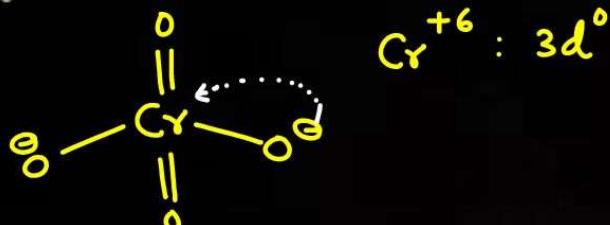
Colour of the compound is the complementary colour of absorbed light.

Configuration	Example	Colour	Configuration	Example	Colour
3d ⁰	Sc ³⁺	Colourless	3d ⁶	Fe ²⁺	Green
3d ⁰	Ti ⁴⁺	Colourless	3d ⁶ /3d ⁷	Co ³⁺ /Co ²⁺	Blue pink
3d ¹	Ti ³⁺	Purple	3d ⁸	Ni ²⁺	Green
3d ¹	V ⁴⁺	Blue	3d ⁹	Cu ²⁺	Blue
3d ²	V ³⁺	Green	3d ¹⁰	Zn ²⁺	Colourless
3d ³	V ²⁺	Violet	Color depends upon 1) Nature of ligand (w_{FL} s_{FL}) 2) Geometry of the complex $\Delta_t \ll \Delta_o$ 3) Presence of unpaired electrons		
3d ³	Cr ³⁺	Violet			
3d ⁴	Mn ³⁺	Violet			
3d ⁴	Cr ²⁺	Blue			
3d ⁵	Mn ²⁺	Pink			
3d ⁵	Fe ³⁺	Yellow			



Charge Transfer Spectra

Some ions are coloured even though they have no incompletely filled d orbitals.



Deep yellow

Purple

Orange



Alloy ♦ Mixture of elements

i) Brass $\longrightarrow \text{Cu} + \text{Zn}$

ii) Bronze $\longrightarrow \text{Cu} + \text{Sn}$

iii) Gun metal / Bell metal $\longrightarrow \text{Cu} + \text{Zn} + \text{Sn}$

iv) Stainless steel $\longrightarrow \text{C} + \text{Fe} + \text{Cr} + \text{Ni}$



F Block Element

Inner transition elements

ns $(n-1)d$ $(n-2)f$

P
W

Lanthanoids

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu

Pm (প্রমেথিয়াম : Radio-active)

Actinoids

Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr

Silvery white metals

Radioactive metals

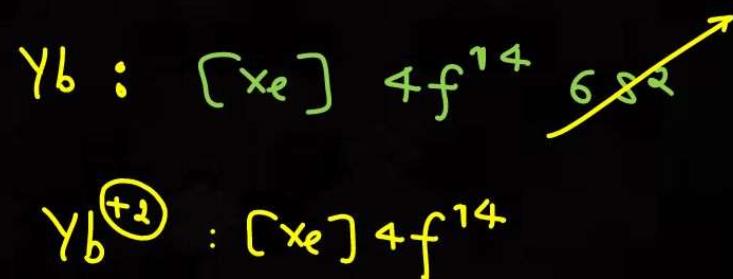
- Only Promethium, is radioactive in Lanthanides.
- Elements of f-block are soft in nature and on expose to air get oxidized.

Q.

Which one of the following lanthanoids does not form MO_2 ?
[M is lanthanoid metal]

[26th Feb 2021]

- A Nd
- B Dy
- C Yb ✓
- D Pr



Q.

The lanthanoid that does NOT show +4 oxidation state is :

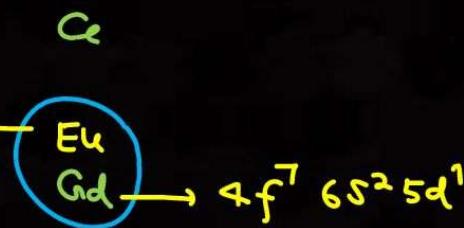
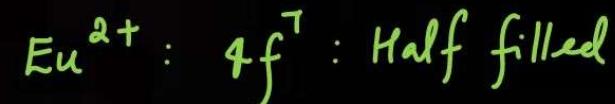
[06th Sep 2020 (I)]

A Dy

B Ce

C Eu

D Tb



Q.

The correct electronic configuration and spin-only magnetic moment (BM) of Gd^{3+} ($Z = 64$), respectively, are :

[05th Sep 2020 (I)]

A

$[\text{Xe}]4f^7$ and 8.9

B

$[\text{Xe}]4f^7$ and 7.9

C

$[\text{Xe}]5f^7$ and 8.9

D

$[\text{Xe}]5f^7$ and 7.9

7. BM

 $\text{Gd}^{3+} : 4f^7$

1	1	1	1	1	1	1
---	---	---	---	---	---	---

 $\text{Gd} : [\text{Xe}] \cancel{6s^2} \cancel{5s^2} \cancel{5p^6} 4f^7$

Q.

The electronic configurations of bivalent europium and trivalent cerium are :

(atomic number : Xe = 54, Ce = 58, Eu = 63)

[09th Jan 2020 (I)]



A



B



C



D



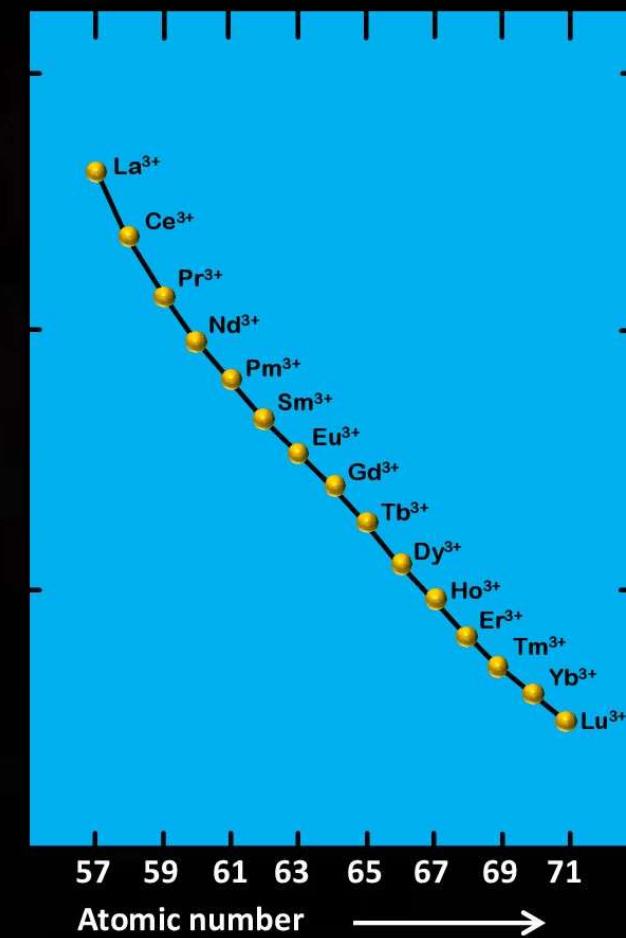


Atomic radius :

Left → Right : $Z_{eff} \uparrow \uparrow$

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu

- This decrease in radius is called as Lanthanide contraction.
- This decrease is due to poor shielding of f-orbital electrons.





Effect of Lanthanide Contraction

n

Atomic size

		Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
4	Sc									
5	³⁹ Y	^	^	^	^	^	^	^	^	^
6	⁵⁷ La	LC.	⁴⁰ Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag
		4f			W				Au	Cd
		↑								↑
	⁵⁸ Ce	→	⁷¹ Lu							Hg

Atomic Radius

Nuclear Charge ↑ : AR ↓

Inter Electron Repulsion ↑ : AR ↑

P
W

Sc to Cr : Decreases

Nuclear charge dominates

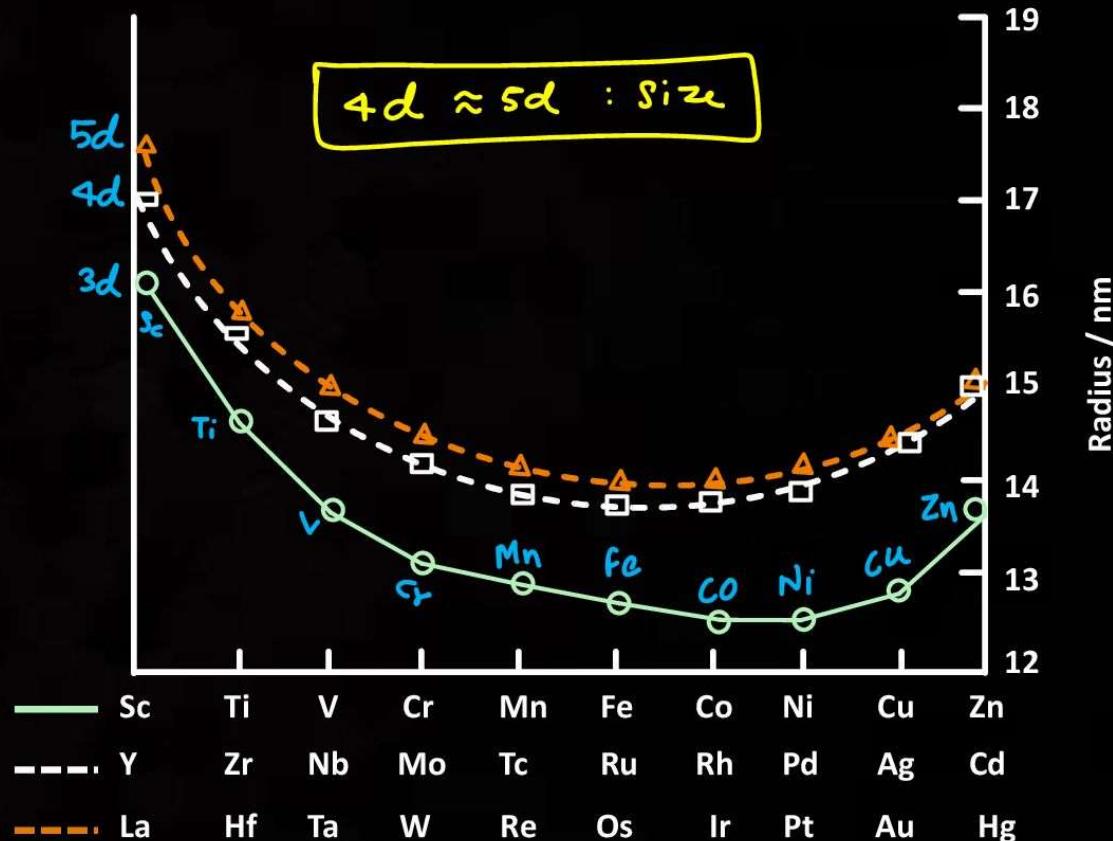
Mn to Ni: Nearly constant

NC = IER

Cu to Zn : Slightly increases

IER dominates

Size : 4d ≈ 5d



Q.

The atomic radius of Ag is closest to:

[07th Jan 2020 (I)]

A

Au ✓

B

Ni

C

Cu

D

Hg

Q.

The pair that has similar atomic radii is :

[12th April 2019 (II)]

A

Mn and Re

B

Ti and Hf

C

Sc and Ni

D

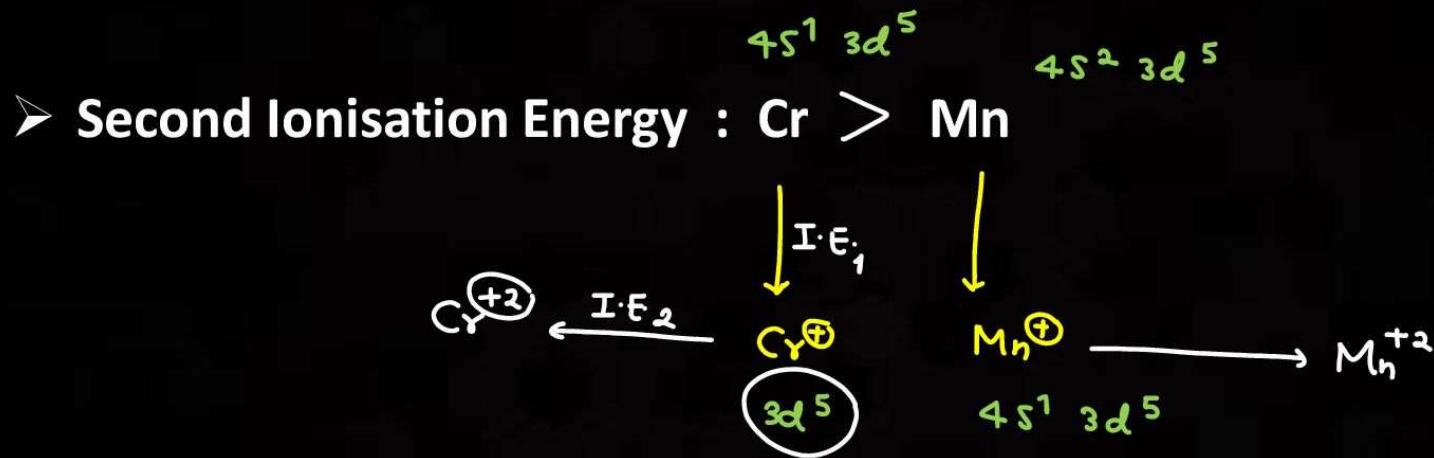
Mo and W



Ionisation Energy



- Increases from left to right due to increase in atomic number.



Q.

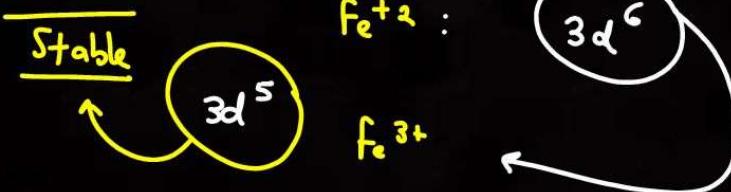
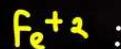
The third ionization enthalpy is minimum for :

A Co

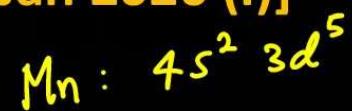
B Fe

C Ni

D Mn



[08th Jan 2020 (I)]





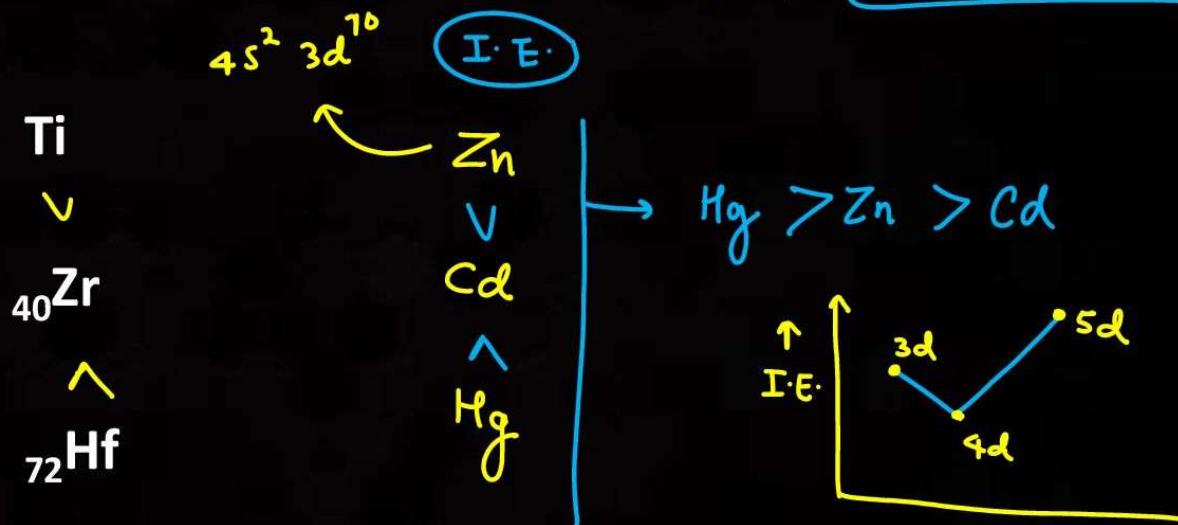
Effect of Lanthanide Contraction on I.E.

$$5d > 3d > 4d : I.E.$$

no. of protons : 5d > 4d
P W

Size : 4d \approx 5d

n
4
Sc
5
^{39}Y
6
^{57}La



- Zn, Cd and Hg have very high I.E. due to their fully filled electronic configuration.

Q.

The correct of the first ionization enthalpies is :

[10th April 2019 (II)]

A

Ti < Mn < Zn < Ni

B

Ti < Mn < Ni < Zn

C

Mn < Ti < Zn < Ni

D

Zn < Ni < Mn < Ti



Melting point and Boiling Point

4s 3d

P
W

➤ No. of unpaired electrons ↑ : Metallic bonding ↑ : M.P. / B.P. ↑

Sc : 1

4s¹ 3d⁵

Cr : 6

Ti : 2

Mn : 5

V : 3

Fe : 4

Co : 3

Zn : 0

Ni : 2

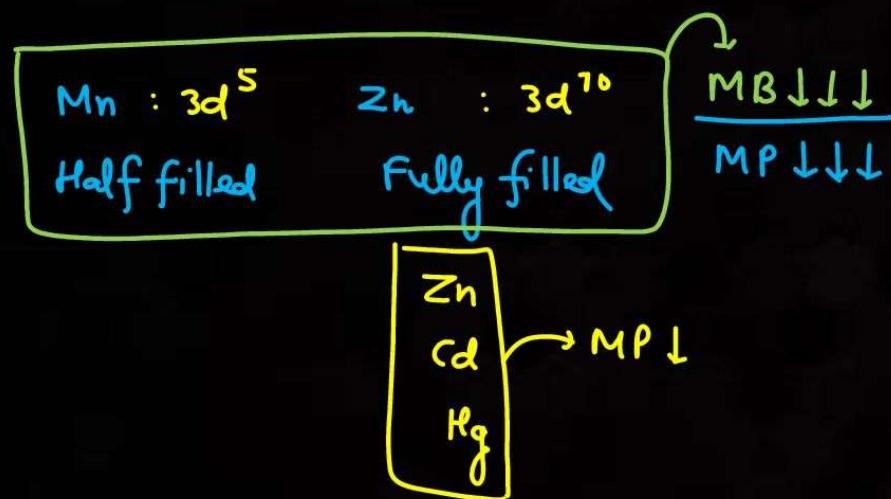
Cu : 1

- Involvement of greater number of electrons from $(n - 1)d$ in addition to the ns electrons in the inter-atomic metallic bonding.
- Because of stronger interatomic bonding, transition elements have high M.P and B.P
- Chromium has highest M.P. among 3d-series.



Q. Which Group element has the highest Melting point ?

Note : Due to high melting point Tungsten W is used in bulb filament

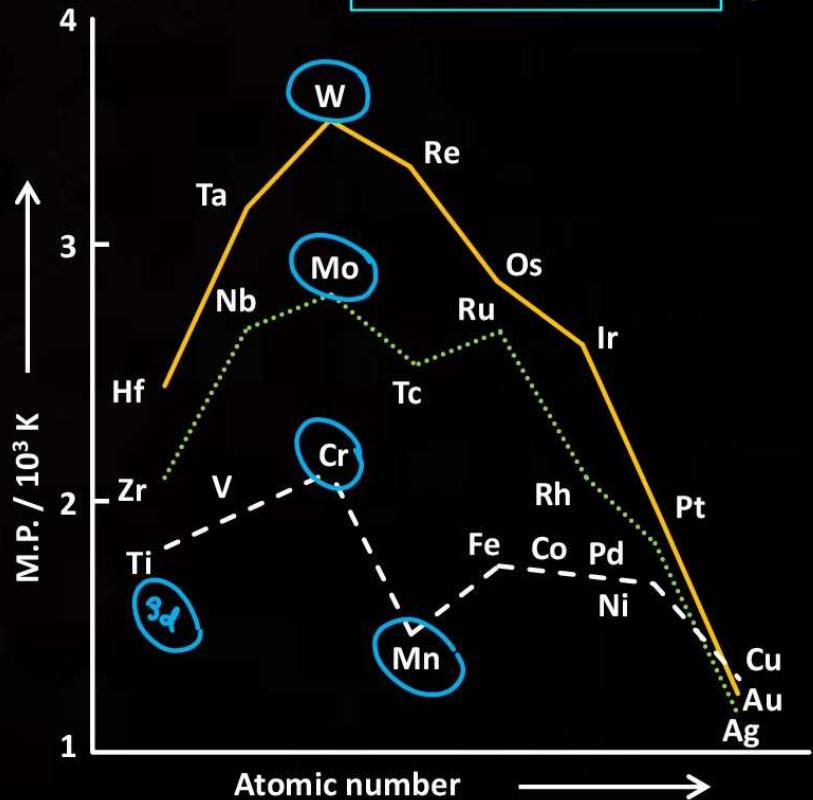


As Mn and Zn has stable configuration, so they won't like to lose electron for delocalization leads weak metallic bonding hence low M.P.

Group 6
3d : Cr
4d : Mo
5d : W

P
W

$M_B \uparrow$
 $M_P \uparrow$





Heat of Atomization



The energy required to break 1 mole of metal lattice in to neutral metal atom



- No. of unpaired electrons ↑ : metallic bonding ↑ : heat of atomization ↑
- VANADIUM has highest heat of atomization among 3d-series.
→ Stable EC
- Mn and Zn has low enthalpy of atomization ?

HOA : 3d < 4d < 5d ^{Series}
 $\curvearrowright M\beta \uparrow$

Q.

The transition element that has **lowest enthalpy of atomization** is :

P
W

[09th Jan 2019 (II)]

A Fe

B Cu

C V

D Zn

Mn
Zn

$HOA \downarrow$
 $EOA \downarrow$

Interstitial Compounds

When small atoms (H, C , N) are trapped inside the crystal lattices of metals.

$$\text{M.P. : Ti} < \text{TiC}$$

TiC
very hard.

They are usually non stoichiometric and are neither typically ionic nor covalent.

Example : TiC , Mn₄N , Fe₃H , VH_{0.56} and TiH_{1.7}

Physical and Chemical Characteristics : (Jwala OP)

- (i) They have high melting points, higher than those of pure metals.
- (ii) They are very hard (some borides approach diamond in hardness)
- (iii) They retain metallic conductivity.
- (iv) They are chemically inert.

Q.

The statement that is INCORRECT about the interstitial compounds is :

P
W

[08th April 2019 (II)]

A

They are chemically reactive

B

They are very hard

C

they have metallic conductivity.

D

They have high melting points.



Catalytic Activity



Factors responsible for catalytic activity of transition metals.

- Large surface area.
- Variable oxidation state.
- Ability to form complexes.
- Presence of empty d – orbitals.



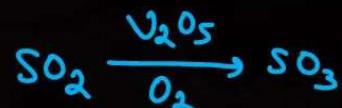
Mn MnO_2 : Used as a catalyst in producing oxygen



Ti $\text{TiCl}_4 + \text{Et}_3\text{Al}$ }

Ziegler Natta Catalyst

Polythene from ethene



V V_2O_5

V_2O_5 is used in Contact process

Cr $\text{Al}_2\text{O}_3 + \text{Cr}_2\text{O}_3$ Used for aromatization



Note : The photographic industry relies on the special light-sensitive properties of AgBr .

Highest Density Osmium (Os) = 22.51 g/cm^3 , Iridium (Ir) = 22.61 g/cm^3

Q.

Match the catalysts (Column I) with products (Column II).

	Column I (Catalyst)		Column II (Product)
(a)	V_2O_5	(i)	Polyethylene
(b)	$TiCl_4 / Al(Me)_3$	(ii)	ethanol
(c)	$PdCl_2$	(iii)	H_2SO_4
(d)	Iron Oxide	(iv)	NH_3

[09th April 2019 (I)]

A

(a) – (iii), (b) – (iv), (c) – (i), (d) –(ii)

B

(a) – (ii), (b) – (iii), (c) – (i), (d) –(iv)

C

(a) – (iii), (b) – (i), (c) – (ii), (d) –(iv)

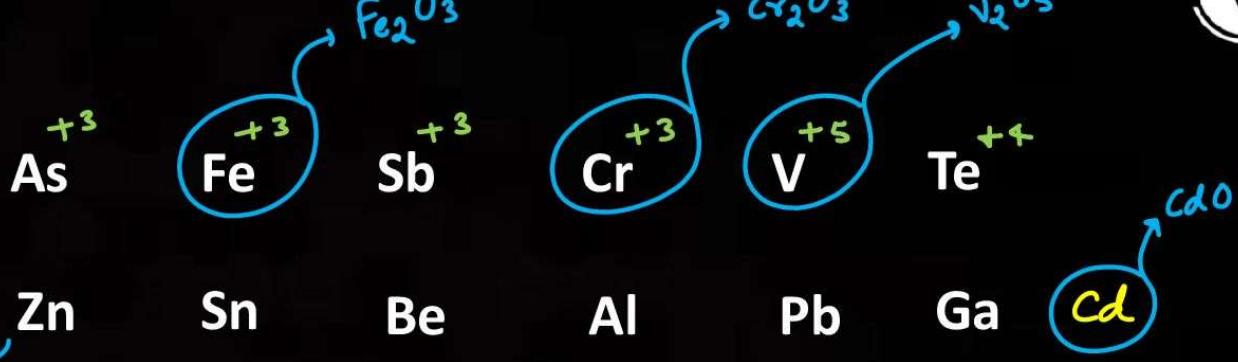
D

(a) – (iv), (b) – (iii), (c) – (ii), (d) –(i)

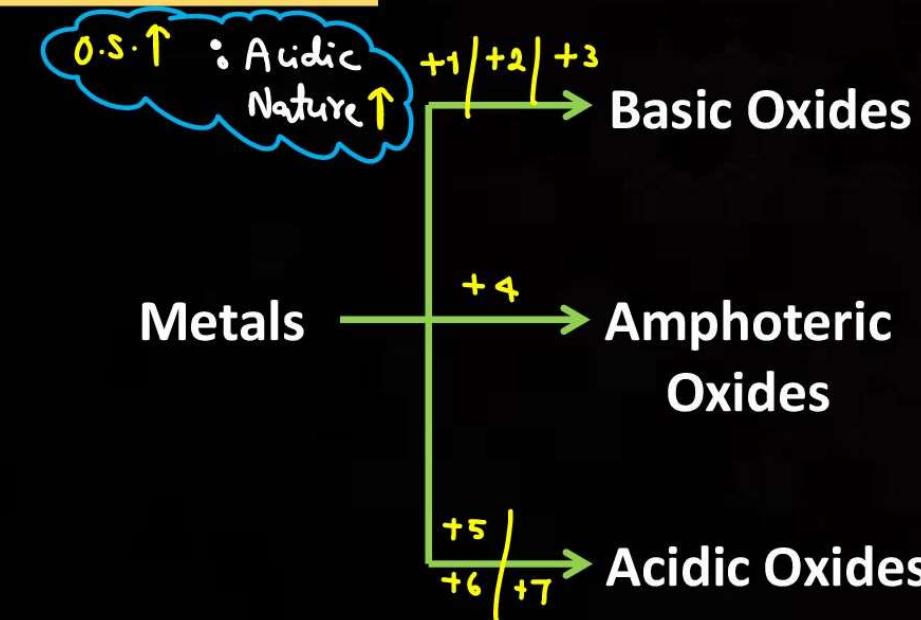


Oxides

Amphoteric Oxides



Basic Oxides



Cr^{+2}
 CrO : Basic Oxide

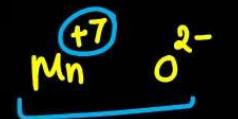
Cr^{+3}
 Cr_2O_3 : Amp. Oxide

Cr^{+6}
 CrO_3 : Acidic Oxide

Oxides of Transition Elements



P
W



Covalent
Character ↑

Mn_2O_7
: Covalent
molecule

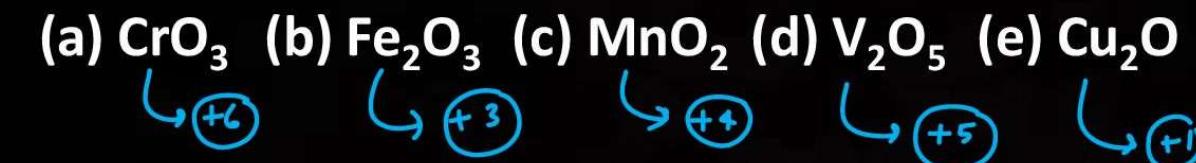
Oxidation Number	3	4	5	6	Groups 7	8	9	10	11	12
+7					Mn_2O_7					
+6					CrO_3					
+5			V_2O_5		V_2O_4					
+4	Sc_2O_3	TiO_2		CrO_2		MnO_2				
+3		Ti_2O_3	V_2O_3	Cr_2O_3	Mn_2O_3	Fe_2O_3				
+2		TiO	VO	(CrO)	MnO	FeO	CoO	NiO		
+1				Basic		Mn_3O_4	Fe_3O_4	Co_3O_4	CuO	ZnO

□ All the metals except Sc form MO oxides which are ionic.

□ As the oxidation number of a metal increases, ionic character decreases. In the case of Mn, Mn_2O_7 is a covalent green oil. Even CrO_3 and V_2O_5 have low melting points. In these higher oxides, the acidic character is predominant.

Q.

The correct order of following 3d metal oxides, according to their oxidation numbers is:



[31th Aug 2021]

A

$$(d) > (a) > (b) > (c) > (e)$$

B

$$(a) > (c) > (d) > (b) > (e)$$

C

$$(a) > (d) > (c) > (b) > (e)$$

D

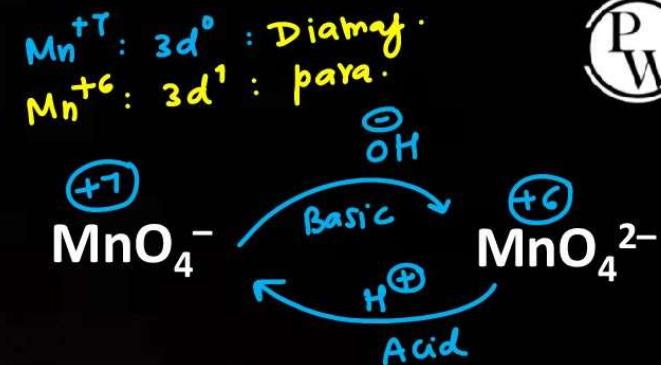
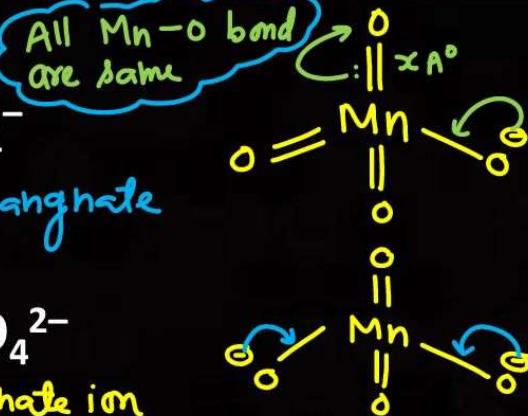
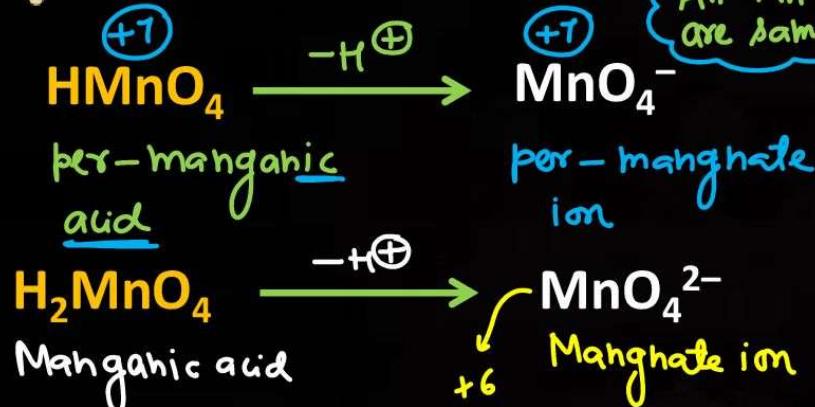
$$(c) > (a) > (d) > (a) > (b)$$

P
W



Oxides/Oxi-anions of Transition

P
W

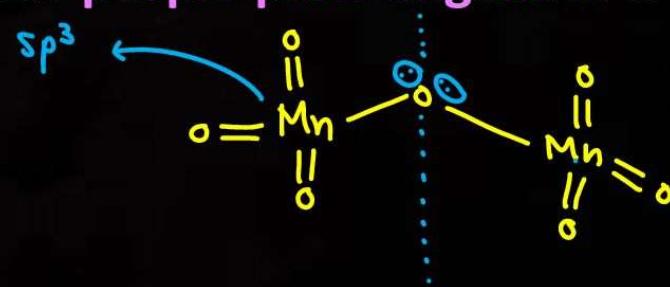


The green manganate is paramagnetic but purple permanganate is diamagnetic.



Non-linear and symmetrical covalent molecule

Each Mn is tetrahedrally surrounded by O's including a Mn-O-Mn bridge.



Q.

The incorrect statements :

P
W

[03rd Sep 2020 (II)]

A

Manganate and permanganate ions are tetrahedral

B

In manganate and permanganate ions, the π -bonding takes place by overlap of p-orbitals of oxygen and d-orbitals of manganese

C

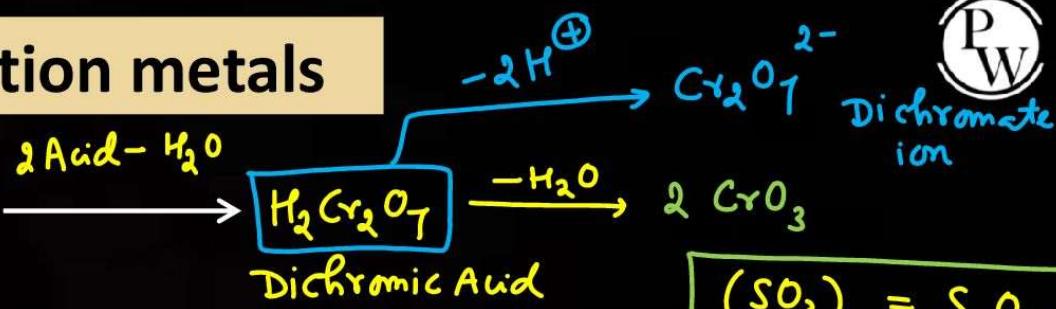
Manganate and permanganate ions are paramagnetic

D

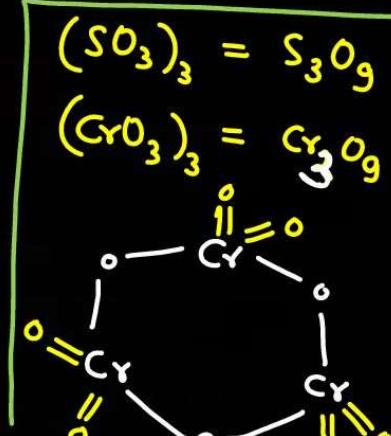
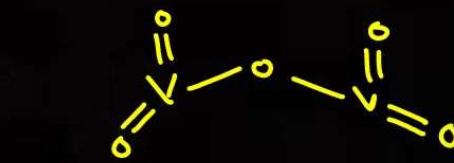
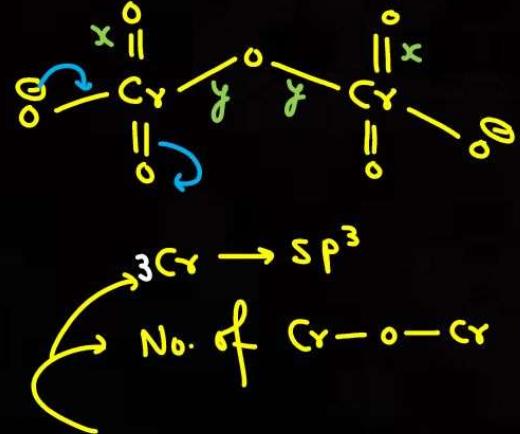
Manganate ion is green in colour and permanganate ion is purple in colour



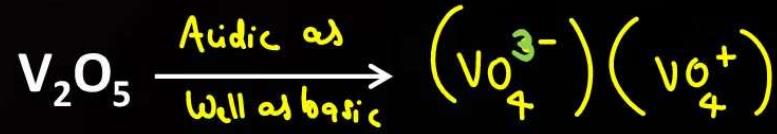
Oxides/Oxi-anions of Transition metals



$\hookrightarrow 6(\text{Cr}-\text{O})$
 $\hookrightarrow 2(\text{Cr}-\text{O})$



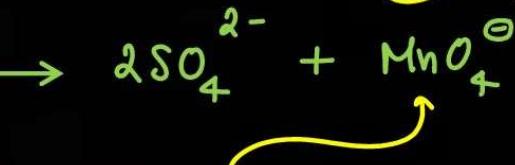
#



Note : SO_3 and CrO_3 have same cyclic structure

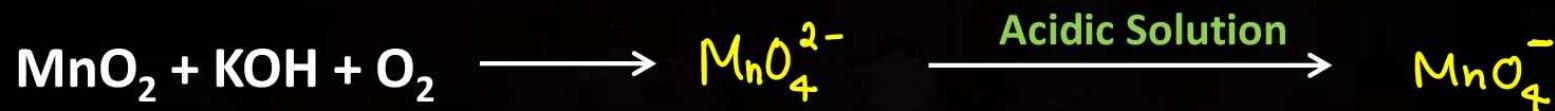
Preparation of KMnO_4

Preparation from $\text{S}_2\text{O}_8^{2-}$

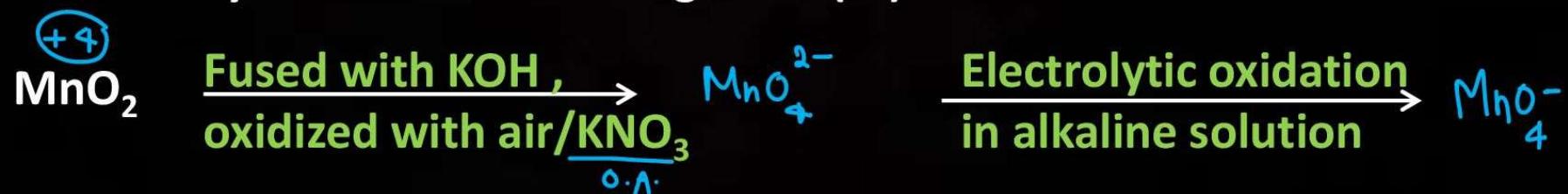


Manganese (II) ion salt is oxidised by peroxodisulphate to permanganate.

From MnO_2 (Pyrolusite)



Commercially it is prepared by the alkaline oxidative fusion of MnO_2 followed by the electrolytic oxidation of manganate (VI).

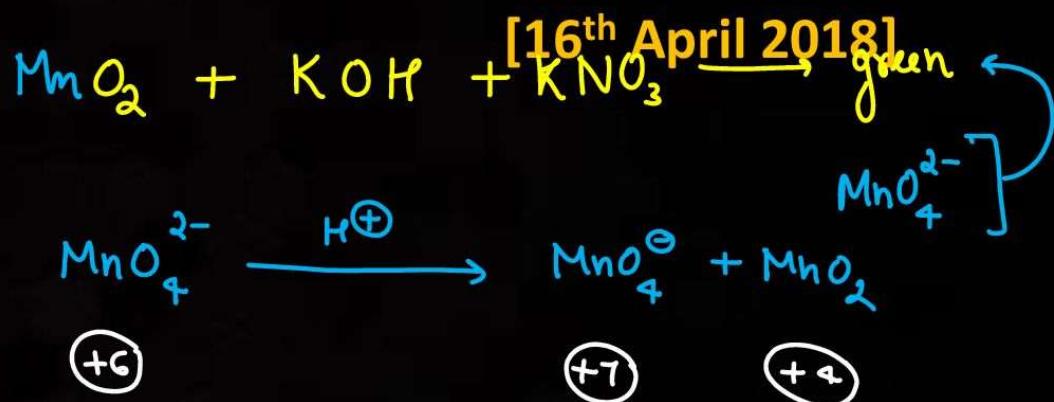


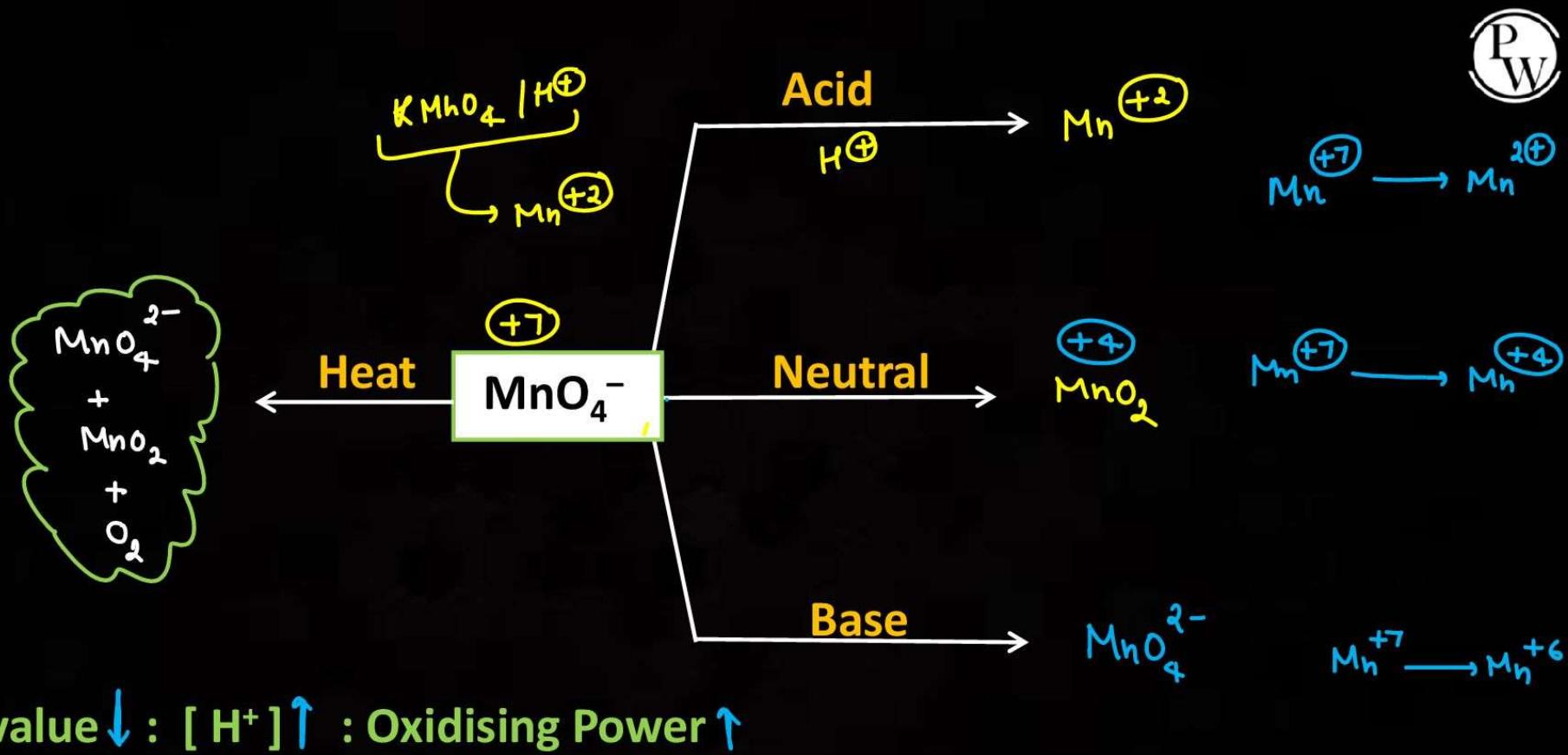
Q.

When XO_2 is fused with an alkali metal hydroxide in presence of an oxidizing agent such as KNO_3 a dark green product is formed which disproportionates in acidic solution to afford a dark purple solution.

X is:

- A Mn
- B Cr
- C V
- D Ti





Oxidising Power : $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^-$

Q.

Given below are two statements :

Statement I: Potassium permanganate on heating at 573 K forms potassium manganate.



Statement II: Both potassium permanganate and potassium manganate are tetrahedral and paramagnetic in nature.

In the light of the above statements, choose the most appropriate answer from the options given below:

[17th March 2021]

A

Statement I is true but statement II is false

B

Statement I is false but statement II is true

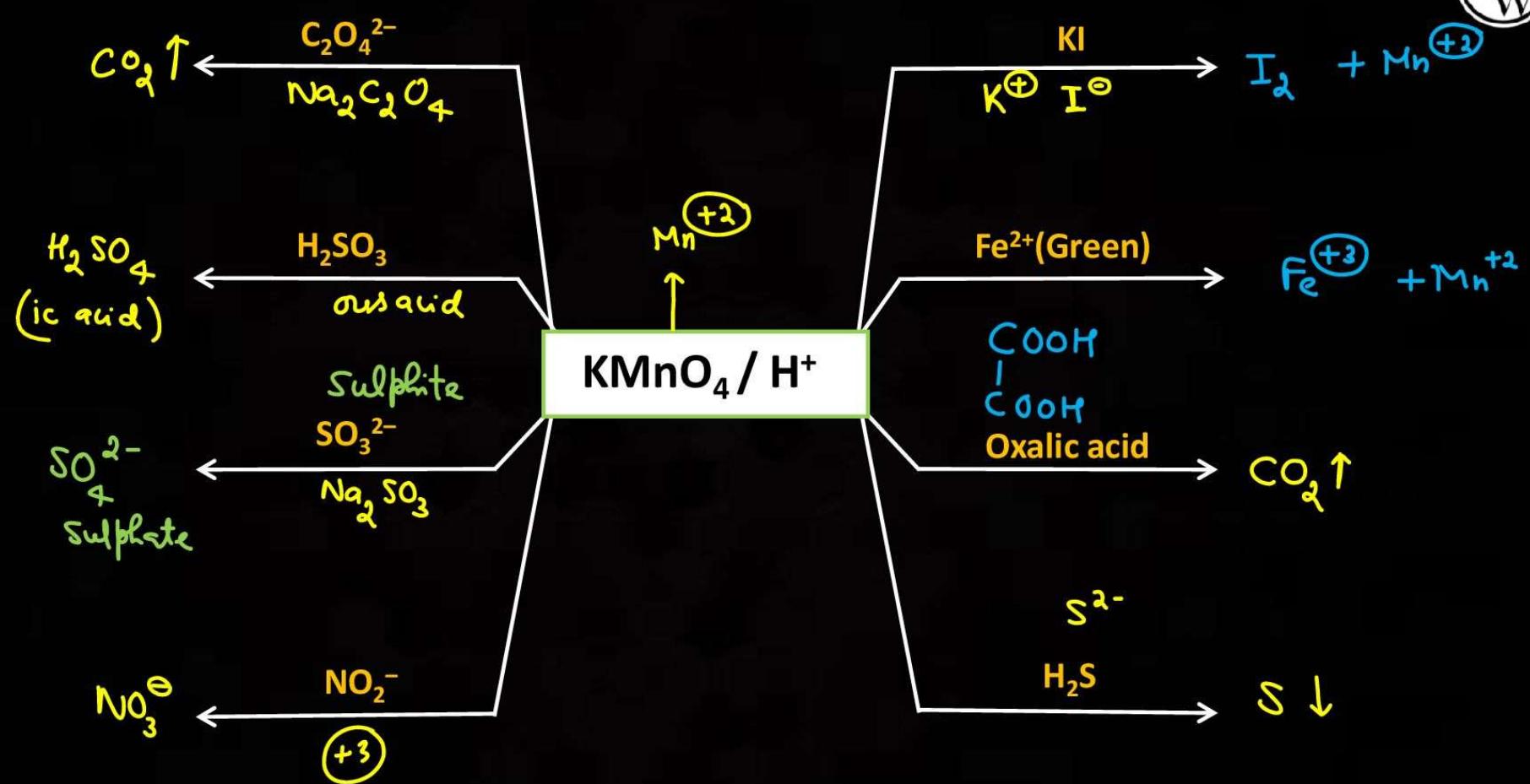
C

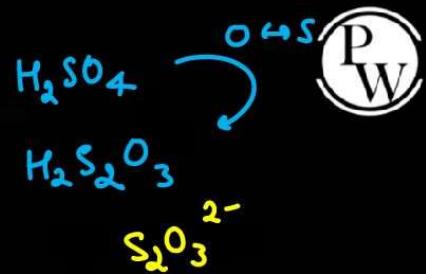
Both statement I and statement II are false

D

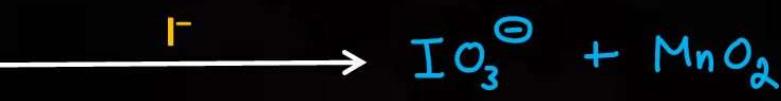
Both statement I and statement II are true

P
W





Slight Basic
 Neutral



Q.

Thermal decomposition of a Mn compound (X) at 513 K results in compound Y, MnO_2 and a gaseous product. MnO₂ reacts with NaCl and concentrated H₂SO₄ to give a pungent gas Z . X, Y and Z respectively, are :

[12th April 2019 (II)]

A

KMnO₄, K_2MnO_4 and Cl₂

B

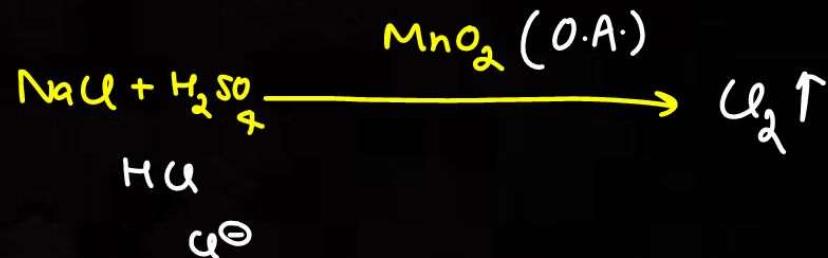
K_2MnO_4 , KMnO₄ and SO₂

C

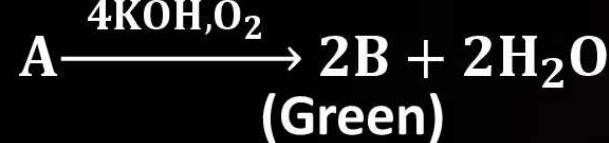
K_3MnO_4 , K_2MnO_4 and Cl₂

D

K_2MnO_4 , KMnO₄ and Cl₂



Q.



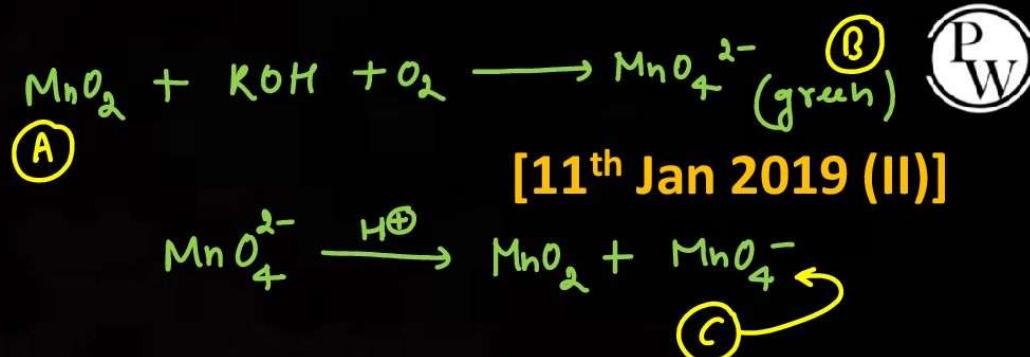
In the above sequence of reactions, A and D, respectively, are :

A

KI and KMnO_4

C

KIO_3 and MnO_2



B

MnO_2 and KIO_3

D

KI and K_2MnO_4



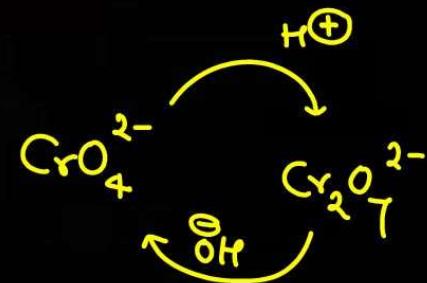
Preparation of Potassium Dichromate

P
W

Jwala OP

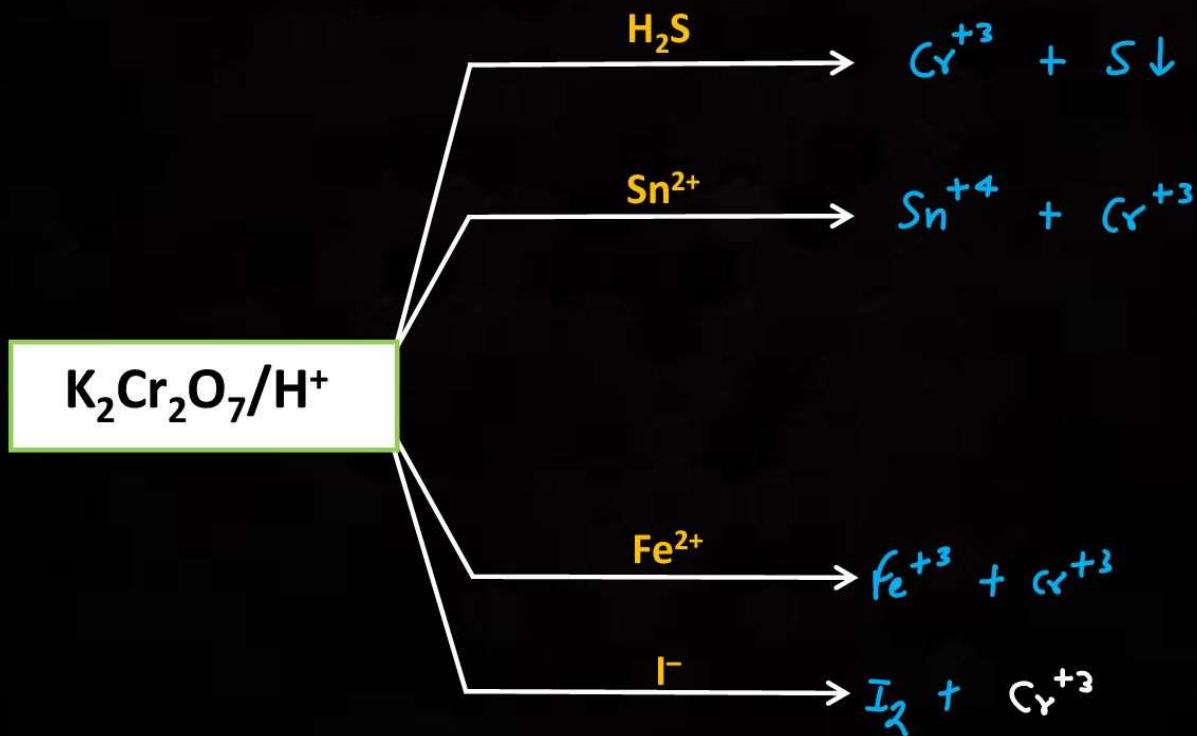
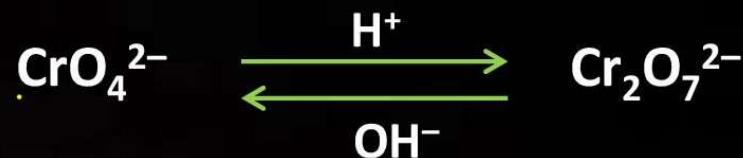
$K_2Cr_2O_7$

➤ From Chromite Ore : $FeCr_2O_4$



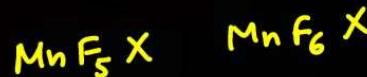
□ Any chromate with acid gives dichromate.

□ The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution.





Halides of d block elements



Highest Mn fluoride : MnF_4 (+4) Highest oxide : Mn_2O_7 (+7)

The ability of oxygen to form multiple bonds to metals explains its superiority.

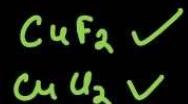
V^{+5} is represented only by VF_5 .



The other halides, however, undergo hydrolysis to give oxohalides VOX_3 .

Another feature of fluorides is their instability in the low oxidation states e.g.

VX_2 ($X = Cl, Br$ or I)

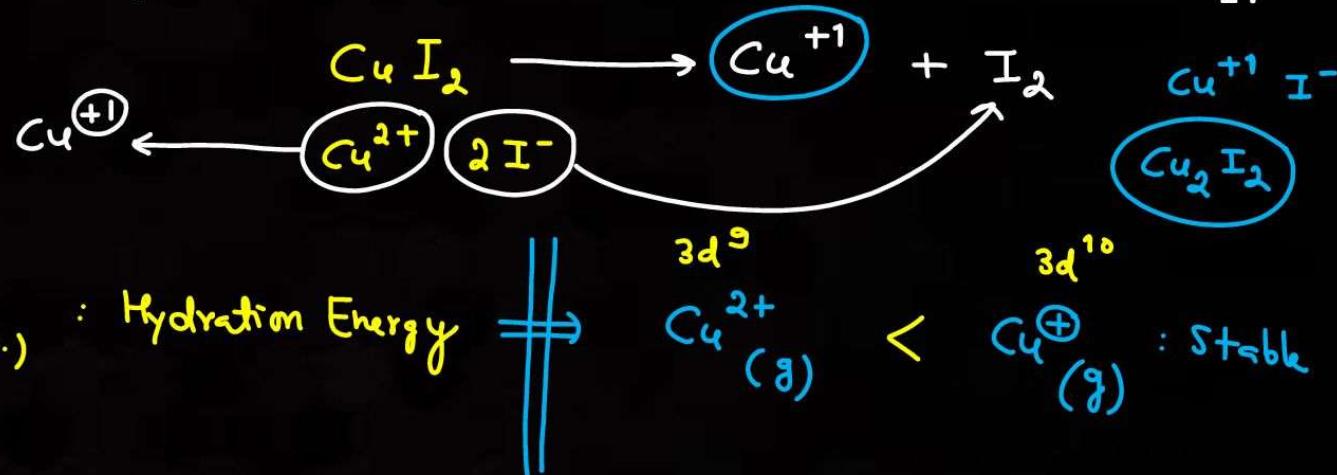


Cu



P
W

All Cu(II) halides are known except the iodide. In this case, Cu^{2+} oxidises I^- to I_2 .



The stability of Cu^{2+} (aq) rather than Cu^+ (aq) is due to the much more negative ΔH_{hyd} of Cu^{2+} (aq) than Cu^+ , which more than compensates for the second ionisation enthalpy of Cu.

Q.

The secondary valency and the number of hydrogen bonded water molecule(s) in $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, respectively, are

P
W

[18th March 2021]

A

5 and 1

B

4 and 1

C

6 and 5

D

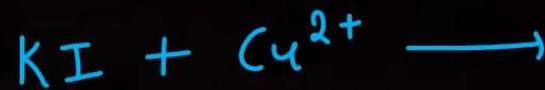
6 and 4

Q.

Cu^{2+} salt reacts with potassium iodide to give

[20th July 2021]

A



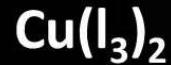
B

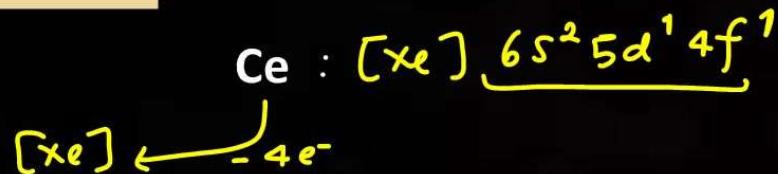


C



D



Lanthanoids

Yb



Name a member of the lanthanoid series which is well known to exhibit +4 oxidation state.

Many trivalent lanthanoid ions are coloured both in the solid state and in aqueous solutions. Colour of these ions may be attributed to the presence of f electrons. "Jwala OP"

Neither La^{3+} nor Lu^{3+} ion shows any colour but the rest do so.

Absorption bands are narrow, probably because of the excitation within f level.

The lanthanoid ions other than the f^0 type (La^{3+} and Ce^{4+}) and the f^{14} type (Yb^{2+} and Lu^{3+}) are all paramagnetic.

Lanthanoids



Eu²⁺ is formed by losing the two s electrons and its f⁷ configuration accounts for the formation of this ion.

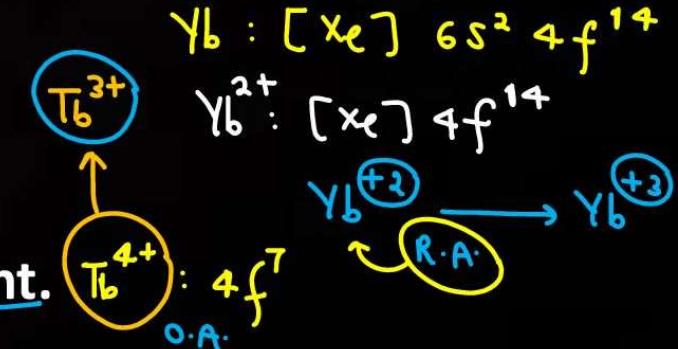
Eu²⁺ is a strong reducing agent changing to the common +3 state.

The behaviour of samarium is very much like europium, exhibiting both +2 and +3 oxidation states.



Yb²⁺ which has f¹⁴ configuration is a reductant.

Tb(IV) has half-filled f-orbitals and is an oxidant.



Pr, Nd, Tb and Dy also exhibit +4 state but only in oxides, MO₂.

Q.

The lanthanide ion that would show colour is :

P
W

[08th April 2019 (I)]

A



B



C



D





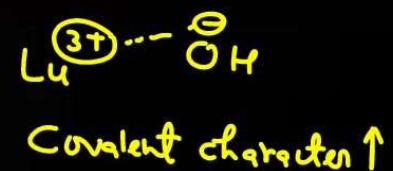
Physical Properties of Lanthanoids

Basicity of Lanthanoids

- As the size of the element across the period decreases basicity decreases.



Size decreases
Basicity decreases



- Samarium (Sm) is steel hard. due to maximum unpaired electrons



Use of Lanthanides



Mischmetall

Ln : 95%
Fe : 5%

The best single use of the lanthanoids is for the production of alloy steels for plates and pipes. A well known alloy is **mischmetall** which consists of a **lanthanoid metal (~ 95%)** and **iron (~ 5%)** and traces of S, C, Ca and Al. A good deal of mischmetall is used in Mg-based alloy to produce bullets, shell and lighter flint.

Mixed oxides of lanthanoids are employed as catalysts in **petroleum cracking**.

Jwala OP

Some individual **Ln oxides** are used as **phosphors** in television screens and similar fluorescing surfaces.

A phosphor is a substance that have phenomenon of luminescence and it emits light when exposed to some type of radiant energy.

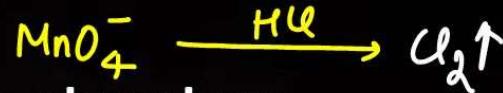
Q.

The incorrect statement(s) among (1) - (3) is (are):

(1) W(VI) is more stable than Cr(VI).

(2) In the presence of HCl, permanganate titrations provide satisfactory results.

(3) Some lanthanoid oxides can be used as phosphors.



A (2) and (3) only

B (1) and (2) only

C (2) only

D (1) only

Self Indicator



MnO_4^- : Purple

[04th Sep 2020 (II)]



Q.

Mischmetal is an alloy consisting mainly of :

P
W

[06th Sep 2020 (I)]

A

Lanthanoid metals

B

Actinoid and transition metals

C

Lanthanoid and actinoid metals

D

Actinoid metals



Actinides

P
W

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

प्र०

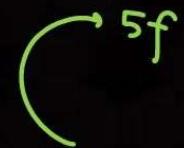
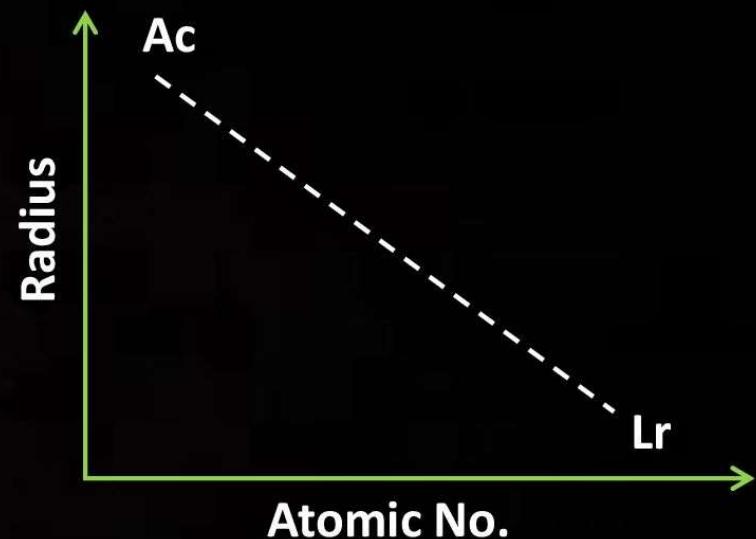
Silvery white metals

Radioactive metals

Atomic radius :

- Actinides also shows contraction in radius similar to lanthanides due to poor shielding of f-electrons.

Shielding : $4f < 5f$
Power



Why radii contraction is more for Actinides than the Lanthanides?

Actinoid contraction is greater from element to element than lanthanoid contraction. Why ?



Oxidation state of Actinides

→ Common OS : + 3



Q.

The highest possible oxidation states of uranium and plutonium respectively, are :

P
W

↳
6

[10th April 2019 (II)]

A

6 and 7

B

6 and 4

C

7 and 6

D

4 and 6

Q.

The maximum number of possible oxidation states of actinoids are shown by :

P
W

[09th April 2019 (II)]

A

Nobelium (No) and lawrencium (Lr)

B

Actinium (Ac) and thorium (Th)

C

Berkelium (Bk) and californium (Cf)

D

Neptunium (Np) and plutonium (Pu)