

# PERIODIC CLASSIFICATION OF ELEMENT

## DOBERNIER TRIADS:-

- Arranged elements in the group of 3.
- Atomic mass of middle element is average of atomic mass of other two elements.



### Drawbacks:-

- as known elements were not grouped

## Lothar Meyer's Curves:-



- Alkali metals → top position
- Alkaline earth metals → descending
- Halogen → ascending position.

## MODERN PERIODIC TABLE:-

- long form of periodic table
- based on Moseley law:  $\sqrt{f} = a - b(Z - c)$
- Periodic properties are periodic function of their atomic number.

**Periodicity** - Repetition of similar properties of elements after regular interval of time.

**Cause of periodicity** - due to similar  $e^-$  configuration.

**Transition elements**; they have incompletely filled d-orbitals in their ground state.

Zn, Cd, Hg → are not transition elements because of completely filled d-orbitals. (pseudo transition elements).

**Representative elements** - Combined elements of s and p block are known as representative elements.

## NEWLAND'S OCTAVE RULE:-

- When elements are arranged in increasing order of atomic mass, then every 8th element standing from first will show same property.



### Drawbacks:-

1. Valid upto calcium only
2. No position of inert gases
3. Not worked on heavier elements.

## MENDLEEV'S PERIODIC

- Periodic property of elements are periodic function of their atomic masses.

### Merits:-

- Simplified study
- Some vacant space was left for the elements which were not known at that time.

Eka aluminium → Ga  
Eka silicon → Ge

- Corrected atomic mass of element

### Demerits:-

- (a) Position of hydrogen was not fixed
- (b) Could not explain periodicity.

## MODERN PERIODIC TABLE:-

18 groups and 7 periods.

4-Blocks

s-Block =  $G_1$  and  $G_2 = ns^1-2$

p-Block =  $G_{13} - G_{18} = ns^2 np^1-6$

d-Block =  $G_3 - G_{10} = (n-1)d^1-10 ns^2$

f-Block = lanthanoid =  $2 = 5f^1-7$

actinoids =  $2 = 5f^1-10$   
 $G_3$  and  $P_6$

### Diagonal Relation;

Li → Be → B → similar  
Na → Mg → Al → change ratio  
size

### Nomenclature;

0 → nil	5 → pent	Suffix = turn
1 → un	6 → hex	100 unnilpentium
2 → bi	7 → sept	
3 → tri	8 → oct	
4 → quad	9 → enn	

## EFFECTIVE NUCLEAR CHARGE

$Z_{eff} = Z - \sigma$

Trends - Period →  $Z_{eff} \uparrow$

Group →  $Z_{eff}$  almost remains same. or  $Z_{eff} \uparrow \downarrow$

Shielding →  $s > p > d > f$

→ more +ve charge, more is  $Z_{eff}$ .

→ more -ve charge, less is  $Z_{eff}$ .

## IONISATION ENERGY

- Energy required to remove an electron from an isolated gaseous atom.



IE = IE<sub>1</sub> < IE<sub>2</sub> < IE<sub>3</sub> ...

Trends -  $Z_{eff} \propto$  IE

Period -  $Z_{eff} \uparrow =$  IE  $\uparrow$

Group -  $Z_{eff} \downarrow =$  IE  $\downarrow$

$G_2 = O > AL > Ga > In$

$G_{14} = C > Si > Ge > Pb > Sn$

## Period 2:-

$Li < Be < B < C < N < O < F < Ne$

## ATOMIC RADIUS:-

- Distance b/w nucleus and electron of outermost shell.
- But it's impossible to find exact atomic radii.

Reason-1 = atoms too small

2 = atom doesn't have any boundary

**Covalent Radius** - Half of the internuclear distance b/w 2 atoms bonded by covalent bond.



**Metallic Radius** - Half of the internuclear distance b/w 2 atoms bonded by a metallic bond.



**Van der Waals Radius** - Half of the internuclear distance b/w 2 nearest molecules in non-bonded state.



**Trends;** Atomic Radius  $\propto \frac{1}{Z_{eff}}$   
Period →  $Z_{eff} \uparrow =$  Atomic Radius  $\downarrow$   
Group →  $Z_{eff} \downarrow =$  Atomic Radius  $\uparrow$   
Ionic Radius + Reason < Neutral < Anion

## ELECTRON GAIN ENTHALPY:-

- Energy required or released when an  $e^-$  is added to outermost orbit of an isolated gaseous atom. Is known as Electron gain enthalpy.



Note - In majority cases  $\Delta_{eg}H_2$  is -ve (exothermic)

Exception =  $\begin{matrix} B \\ N \end{matrix}$  }  $\Delta_{eg}H_2 = +ve$  due to stable configuration noble gas

Note - Successive electron gain enthalpy is always +ve.

Trends;  $\Delta_{eg}H \propto Z_{eff}$

Period -  $Z_{eff} \uparrow \Rightarrow \Delta_{eg}H \uparrow$

Group -  $Z_{eff} \downarrow \Rightarrow \Delta_{eg}H \downarrow$

$G_2 = S > Se > Te > Po > O$   
→ due to small size Reason!  
→  $e^-e^-$  repulsion.

# Periodic Classification 3rd Chapter 11th Class

**JA Banks**



## **Periodic Classification 3rd Chapter 11th Class:**

## **Periodic Classification 3rd Chapter 11th Class** Book Review: Unveiling the Magic of Language

In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has are more apparent than ever. Its power to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**Periodic Classification 3rd Chapter 11th Class**," compiled by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we will delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

<https://crm.avenza.com/files/publication/Documents/Nys%20Standards%20For%20Relationships%20And%20Biodiversity%20Lab.pdf>

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