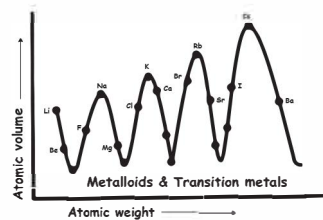


- Law of Triads: Johann Dobereiner (1829)
- Law of Octaves: John Alexander Newlands (1865)
- Lothar Meyer plotted a graph between atomic volume and atomic weight. Elements with similar properties occupied the similar positions on the graph.



- Periodic Law: Dimitri Mendeleev and Lothar Meyer.
It states that the properties of the elements are periodic function of their atomic weights.
- Modern Periodic Law: Henry Moseley (1913)
It states that the physical and chemical properties of the elements are periodic functions of their atomic numbers. ; Horizontal rows - Periods, Vertical columns - Groups re numbered from 1 to 18.

To ease out difficulty in studying individually the chemistry of all the elements and their compounds.

- Electronic Configuration is the distribution of electrons into subshells of an atom.
- In periods: Number of elements in each period is twice the number of atomic orbitals available in the energy level that is being filled.
- Group wise: Elements in same group have similar valence shell electronic configurations, hence same number of electrons in outer orbit and similar properties. These are classified into four blocks i.e., s-block, p-block, d-block and f-block.

Derived from the atomic number of element using numerical roots for 0 and numbers 1-9 and "ium" is added at the end.

IUPAC Nomenclature of elements with atomic no. > 100

Classification of Elements and Periodicity in Properties

Properties	Down the Group	Period (Left to Right)
(a) Atomic Radius : Distance from the centre of the nucleus to the outermost shell containing electrons.	Increases	Decreases
(b) Electron Gain Enthalpy : E Energy released when a neutral isolated gaseous atom accepts an electron to form anion.	Becomes less negative	Becomes more negative
(c) Ionization Energy: The minimum amount of energy required to remove the electron from the outermost orbit of an isolated atom in gaseous state.	Decreases	Increases
(d) Electro negativity : Tendency of an atom to attract the shared pair of electrons towards itself.	Decreases	Increases
(e) Electron Affinity	Decreases	Increases
(f) Valency: Number of univalent atoms which combine with an atom of given element	No Change	Increase from 1 to 4 and then decrease from 4 to 0.
(g) Metallic Character:	Increases	Decreases
(h) Non-Metallic Character	Decreases	Increases

Genesis of periodic classification

Purpose

Periodic table classification based on electronic configuration

Periodic trends in properties of elements

Periodic table classification based on types of elements

Isoelectronic species

Atoms and ions with same number of electrons
eg: O^{2-} , F^- , Na^+ , Mg^{2+} have same number of electrons

Size $\propto \frac{1}{(+)\text{ve charge}}$ $\propto (-)\text{ve charge}$

?) The increasing order of the ionic radii of the given isoelectronic species is:

- (a) S^{2-} , Cl^- , Ca^{2+} , K^+ (b) Ca^{2+} , K^+ , Cl^- , S^{2-}
(c) K^+ , S^{2-} , Ca^{2+} , Cl^- (d) Cl^- , Ca^{2+} , K^+ , S^{2-}

?) Which of the following statements is not correct?

- (a) Ionisation energy increases on going down a group in the periodic table.
(b) Among alkaline earth metals, reducing character increases down the group.
(c) Fluorine is the most electronegative element.
(d) Metallic character increases on going down a group in the periodic table.

s-Block Elements

- Group 1 (alkali metals) and Group 2 (alkaline earth metals)
- Outermost configuration is ns^1 or ns^2
- Reactive with low IE.
- Metallic character and reactivity increases down the group

d-Block Elements

- Group 3-12
- Outer configuration is $(n-1)d^{1-10} ns^{0-2}$
- Forms coloured ions.
- Exhibit variable valence, paramagnetism.
- Also called as Transition elements.
- Some are used as catalysts.

p-Block Elements

- Group 13 to 18.
- Also called as representatives or main group elements
- Outermost configuration varies from $ns^2 np^1$ to $ns^2 np^6$
- At the end of period are low reactive noble gases.
- Halogens and Chalcogens have high negative electron gain enthalpies.
- Metallic character increases down the group

f-Block Elements

- Also called as Inner Transition Elements.
- Contains Lanthanoids and Actinoids.
- Outer configuration is $(n-2)f^{1-14} (n-1)d^{0-1} ns^{0-2}$
- All are metals.
- Actinoids are radioactive.

?) In the long form of the periodic table, the valence shell electronic configuration of $5s^2 5p^4$ corresponds to the element present in

- (a) Group 16 and period 6
(b) Group 17 and period 5
(a) Group 16 and period 5
(b) Group 17 and period 6

