

NEED FOR CLASSIFICATION

To make it easier to understand the chemistry of all the elements and their compounds separately.

Dobereiner's Triad (1892)

Middle element of each triads had an atomic weight about half way between the atomic weight of other two and also properties between the other two.

Element	Atomic weight
Li	7
Na	23
K	39
Ca	40
Sr	88
Ba	137

Law of Octaves (1865)

J. Alexander Newlands arranged the elements in increasing order of their atomic weight, every 8th element had similar properties to 1st element. Eg. Li resembles with Na.

GENESIS OF CLASSIFICATION

Lothar Meyer

Lothar Meyer found a periodic pattern by plotting physical properties like atomic volume, B.P and M.P against atomic weight.

Mendeleev Periodic Law

Properties of elements are a periodic function of their atomic weights. Mendeleev periodic elements Eka-Aluminium as Gallium.

3. CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

MODERN PERIODIC TABLE

- ✦ **Modern Periodic Law:** Physical and chemical properties of elements are periodic functions of their atomic number.
- ✦ Father of modern periodic table: Dimitri Mendeleev
- ✦ 7 Horizontal rows: **Periods**;
18 Vertical columns: **Groups**

Legend:

- Alkali Metal
- Alkaline Earth Metal
- Transition Metal
- Lanthanide
- Actinide
- Unknown Properties
- Metalloid
- Post-transition Metal
- Nonmetal
- Halogen
- Nobel gas

s p d f Blocks

STUDY OF PERIODIC TABLE

S-Block Elements

- Electronic configuration: ns^{1-2}
- Consist of Group 1 (alkali metals)
- and also group 2 (alkali earth metals)

P-Block Elements

- Electronic configuration: ns^2np^{1-6}
- Consist of Group 1 to 18
- Also known as Representative or main group elements.

d-Block Elements

- Electronic configuration: $(n-1)d^{1-10}ns^{0-2}1$ or 2
- Consist of Group 3 to 12
- also known as transition elements

f-Block Elements

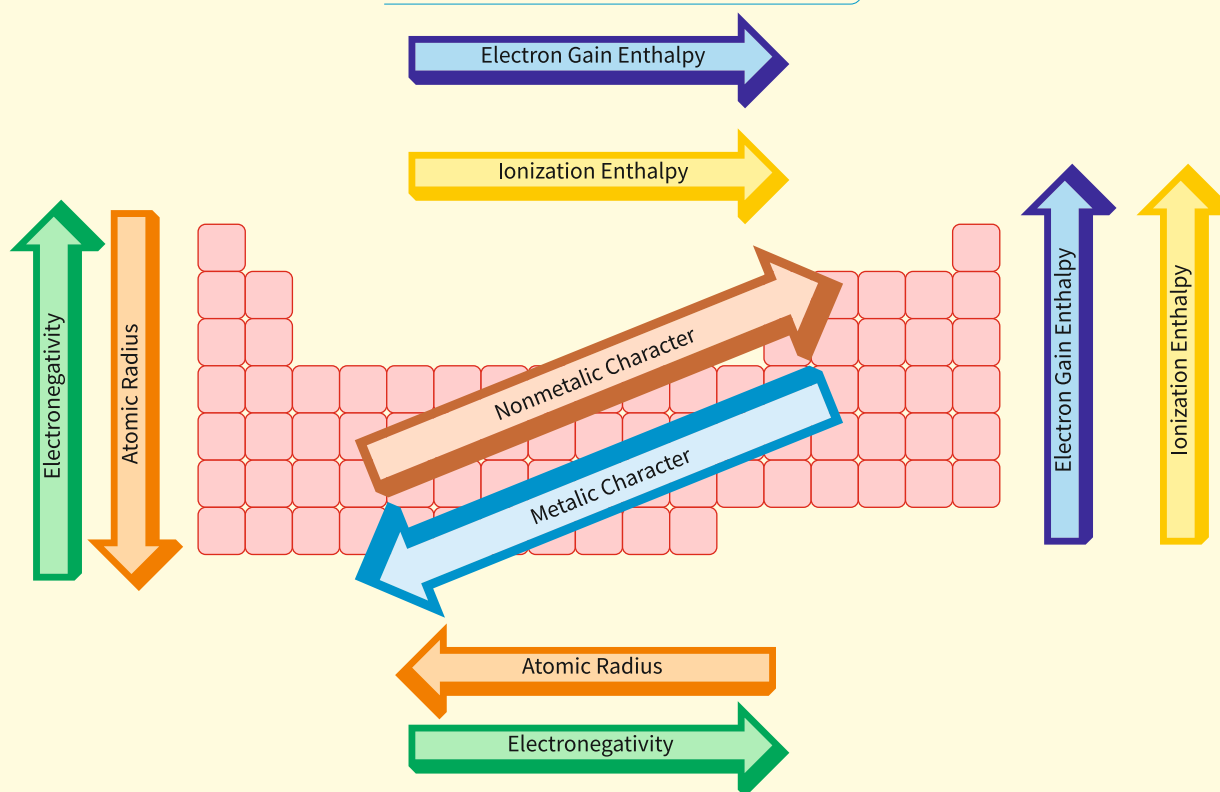
- Electronic configuration: $(n-2)f^{1-14} (n-1)d^{0-1}ns^2$
- Consist of Lanthanoids ($z = 58-71$) and Actinoids ($z = 90-103$)
- also known as Inner transition Elements

NOMENCLATURE OF ELEMENTS (ATOMIC NO. > 100)

Derived from Atomic number of Element using numerical roots for 0 and number 1-9 nad 'ium' is added at the end of name.

Digit	Name	Abbreviation
0	nil	n
1	un	u
2	bi	b
3	tri	t
4	quad	q
5	pent	p
6	hex	h
7	sept	s
8	oct	o
9	enn	e

TRENDS IN PHYSICAL PROPERTIES



TRENDS IN CHEMICAL PROPERTIES

- ✦ The valence of representative elements is generally equal to valence electron or (8-valence electrons).
- ✦ Anomalous behaviour of 2nd period elements is due to their small size, large charge/radius ratio, high electronegativity and only 4 valence orbitals.
- ✦ Diagonal relationship: Li and Be is more similar to Mg as Al respectively.
- ✦ The normal oxides formed by the element on extreme left is most basic (E.g. Na_2O) and formed by elements on extreme right is most acidic (E.g. Cl_2O_7).
- ✦ Oxides of certain Elements are amphoteric (Eg. Al_2O_3) or neutral (Eg. N_2O)
- ✦ Amphoteric oxides are basic in acidic medium and vice versa.