

CH4-Periodic Table and periodicity of properties.

Periodic table:

A table that shows systematic arrangement of elements.

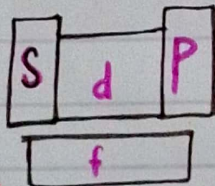
Period (7)

The horizontal rows in periodic table

↳ 1st three periods (shortest)

↳ 4-7 (longest periods)

BLOCKS



Set of elements unified by the atomic orbitals their valance electrons lie in.

sublevels

s → 2

p → 6

d → 10

f → 14

Importance

- help in predicting properties
- categorize the elements on the basis of its electronic configuration.

Group (8A, 8B)

The vertical column of elements in periodic table.

normal/representative elements (A)

Group 1, 2, 3A(13)

4A(14), 5A(15), 6A(16)

7A(17), 8A(18).

transition elements (B)

III B, IV B, V B

IV B, VI B, VII B

~~IX B~~ IB, II B

charge on anion

IUPAC Names	Valency	
↳ IA (Alkali metals)	1	+1
↳ IIA (Alkaline Earth metals)	2	+2
↳ IIIA (Boron family)	3	+3
↳ IVA (Carbon family)	4	+4, -4
↳ VA (Nitrogen family)	3	-3
↳ VIA (Oxygen family)	2	-2
↳ VIIA (Halogens)	1	-1
↳ VIIIA (noble gasses)	0	0

PERIODICITY OF PROPERTIES

— PHYSICAL —

1. Shielding effect

Defination :- the reduction of force of attraction b/w the valance shell and by the electrons and nucleus by the electrons present in inner shells.

Trends :-

- Top to bottom (group) $\rightarrow$ Increases
no of electrons increases
- Left to right (period) $\rightarrow$ Constant
no of shells remain same

2. Atomic size

The average distance b/w nucleus and the valance shells.

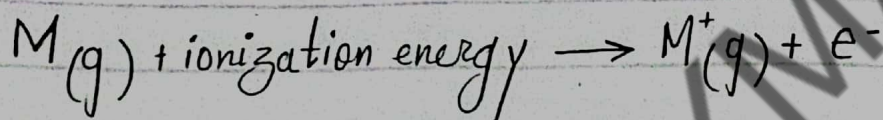
Trends:

- Top to bottom (group) $\rightarrow$ Increases
no of shells increases
- Left to right (period) $\rightarrow$ Decreases.
 - $\hookrightarrow$ Addition of electron
 - $\hookrightarrow$ The attraction b/w nucleus and valance shell increases.

3. Ionization energy

Defination:

The minnium amount of energy required to remove the outermost electron from a isolated gaseous atom (M). (always in metals)



OR Energy that help in formation of cation by removing the valance electrons.

Trends:

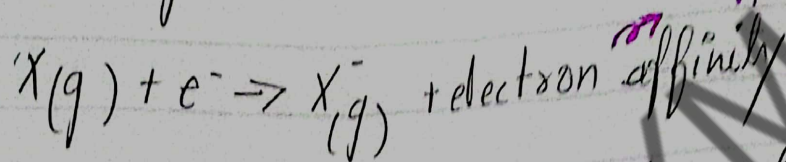
Top to bottom (group) $\rightarrow$ **DECREASES**
left to right (period) $\rightarrow$ **INCREASES**

- $\hookrightarrow$ shells remain same
- $\hookrightarrow$ Atomic size decreases
- $\hookrightarrow$ Shielding effect remains constant
- $\hookrightarrow$ The attraction b/w nucleus and valance electrons increases.

4. Electron Affinity.

Defination:

Amount of energy required to add up valance electron of an isolated atom from uninegative gaseous ion (X) (always in non metals) *energy release.*



OR. Energy that helps in the formation of anion by adding the valance electrons.

Trends:

Top to bottom (group) $\rightarrow$ Decreases

$\hookrightarrow$ Shell is added and sheilding effect increases.

$\hookrightarrow$ Atomic size increases

$\hookrightarrow$ Electron is less tightly bounded to nucleus.

Left to right (period) $\rightarrow$ Increases

$\hookrightarrow$ Atomic radius decreases

$\hookrightarrow$ Electron is more tightly bounded to nucleus.

$\hookrightarrow$ Shell is not added instead valance shells increases.

► CHARACTERISTIC PROPERTIES

1. Metallic character

The property of element that tells that how easily an element loses the valance electrons.

Trends:

- Top to bottom (group): Increases
 - ↳ addition of shells
 - ↳ Weak attraction b/w nucleus and outermost electrons
- Left to right (period): Decreases
 - ↳ Number of electrons increases.
 - ↳ Strong attraction b/w nucleus and outermost electrons.

2. Reactivity

The ability of element to react with other elements to form compound.

Trends: (same as atomic size)

- Top to bottom (group): Increases
 - ↳ Increase in atomic size
 - ↳ Weak attraction b/w nucleus and valance electrons.
- Left to right (period): Decreases
 - ↳ Decrease in atomic size
 - ↳ Strong attraction b/w nucleus and valance electrons making it hard to lose electrons and react.

3. Density

Measurement of how tightly an matter/element is packed together.

• Trends: (depends on mass number)

- Top to bottom (group) → Increase
 - ↳ atomic mass increases
- Left to right (period) → Vary
 - ↳ Middle of period (increase)
 - ↳ The next half (decreases)