

Modern Periodic Table

The physical and chemical properties of elements are periodic functions of their atomic numbers or electronic configurations.

It was observed that the elements with similar properties are repeated according to their electronic configuration at regular intervals of 2,8,8,18,18 or 32. These numbers are called cause of periodicity in properties.

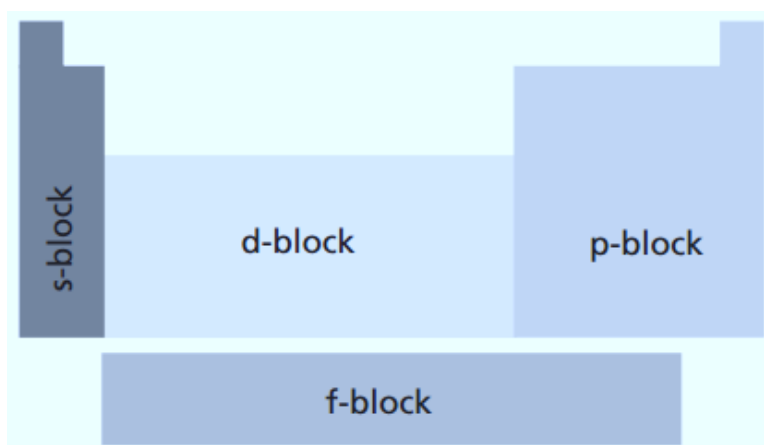
Characteristics of Long form Periodic Table:

- i. Periodic Table contains 7 Horizontal rows (Periods) and 18 vertical columns (Groups)
- ii. Some groups have typical names.
 - a) Elements of group 1 are called alkali metals.
 - b) Elements of group 2 are called alkaline earth metals
 - c) Elements of group 15 are called pnictogens
 - d) Elements of group 16 are called chalcogens
 - e) Elements of group 17 are called halogens
 - f) Elements of group 18 are called noble gases
- iii. The elements of group 1, 2 & 13 to 17 are called main group elements. These are also called as representative or normal elements.
- iv. The element of group 3 to 12 is called transition elements.
- v. Elements with atomic number 58 to 71 are called lanthanides whereas the elements with atomic number 90 to 103 are called actinides. These elements are also known as f-block elements or inner-transition elements.
- vi. Lanthanides (4f-series) and actinides (5f-series) are placed in two separate rows below the main periodic table to avoid unnecessary side wise expansion of the periodic table.

Classification of Elements in to blocks based on electronic configuration

The electron by which the electronic configuration of the given element differs from that of its preceding element is called the differentiating electron and that electron is the last entering electron of its atom.

- s-block elements
- p-block elements
- d-block elements
- f-block elements



s – block Elements

- a) The elements in which the last electron enters the s-subshell of their outermost energy level are called s- block elements.
- b) It contains elements of groups IA and IIA.
- c) The general electronic configuration of these elements is ns^{1-2} , where 'n' represents the outermost shell.

p – block Elements:

- a) The elements in which the last electron enters the p-subshell of their outermost energy level are called p- block elements.
- b) It contains elements of groups IIIA, IVA, VA, VIA, VIIA and VIIIA (exception- helium)
- c) The general electronic configuration of these elements is $ns^2 np^{1-6}$, where 'n' represents the outermost shell.
- d) It includes metals, non-metals, metalloids, and inert gases.

d – block Elements:

- a) The elements in which the last electron enters the d-subshell of the penultimate energy level are called d- block elements.
- b) This block is situated in between 's' and 'p' blocks of the periodic table.
- c) It contains elements of groups IB, IIB, IIIB, IVB, VB, VIB, VIIB and VIII groups.
- d) The general electronic configuration of these elements is $(n-1) d^{1-10} ns^{1-2}$, where (n-1) represents the penultimate shell and 'n' represents the outermost shell.

f – block Elements:

- a) The elements in which the last electron enters the f-subshell of the anti-penultimate (third to the outer most shell) shell is called f- block elements.
- b) It consists of two series of elements placed at the bottom of the periodic table. The elements of first series follow lanthanum and are called Lanthanides and the elements of second series follow actinium and are called actinides.
- c) The general electronic configuration of these elements is $(n-2)f^{1-14} (n-1) d^{0-1} ns^2$, where 'n' represents the outermost shell, (n-1) represents the penultimate shell and (n - 2) represents the anti-penultimate shell.