PERIODIC CLASSIFICATION OF ELEMENTS

Classification of Elements

The need to simplify and organize the study of elements and their large number of compounds led to the development of the periodic table.

Henry Moseley in 1913 showed that atomic number was a more fundamental property of an element than its atomic mass. Therefore, **atomic number** or **electron number** was adopted as the basis of classification of elements.

Modern Periodic Law

Mendeleev's periodic law was thus modified to Modern periodic law which states that the properties of elements are a periodic function of their atomic number.

Salient Features of Modern Periodic Table

1. When the elements are arranged in increasing order of their atomic numbers, the anomalies of Mendeleev's periodic table are removed. However, the position of hydrogen still remains anomalous. It can be placed either along with alkali metals of group 1 or along with halogens of group 17 of the Modern periodic table.

2. In the **Modern or Long form of the periodic table,** elements are arranged in increasing order of their atomic numbers.

3. The Modern periodic table is based upon electronic configuration of elements.

4. The periodicity in properties of elements is due to periodicity in their outer electronic configurations.

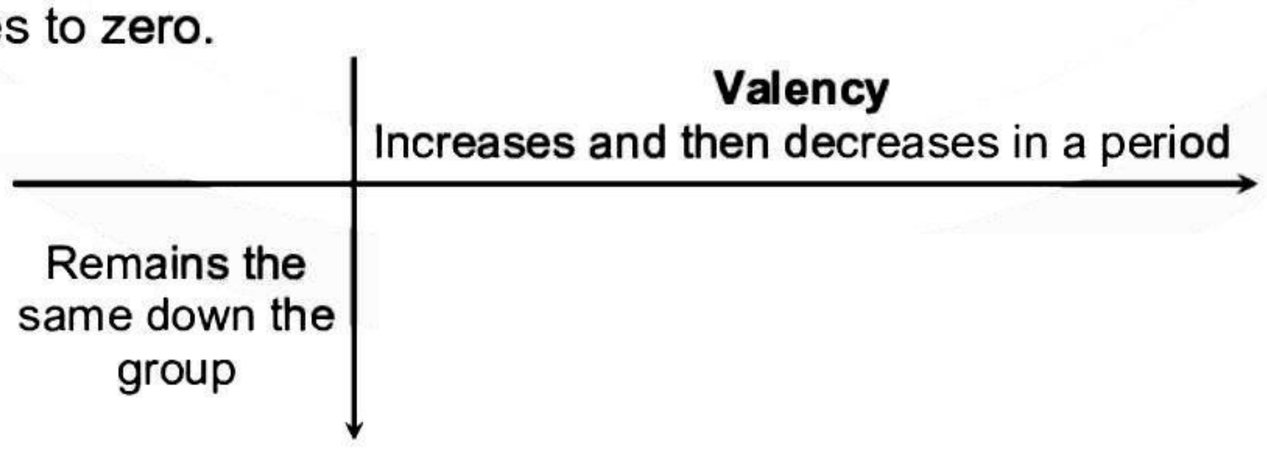
5. The numbers 2, 8, 8, 18, 18 and 32 after which the properties of elements get repeated are the **magic numbers** on which this classification is based.

6. The Modern periodic table consists of 18 vertical columns called **groups** and 7 horizontal rows called **periods.**

7. Each period starts with the filling of electrons in a new electronic shell and the elements in a period have consecutive atomic numbers.

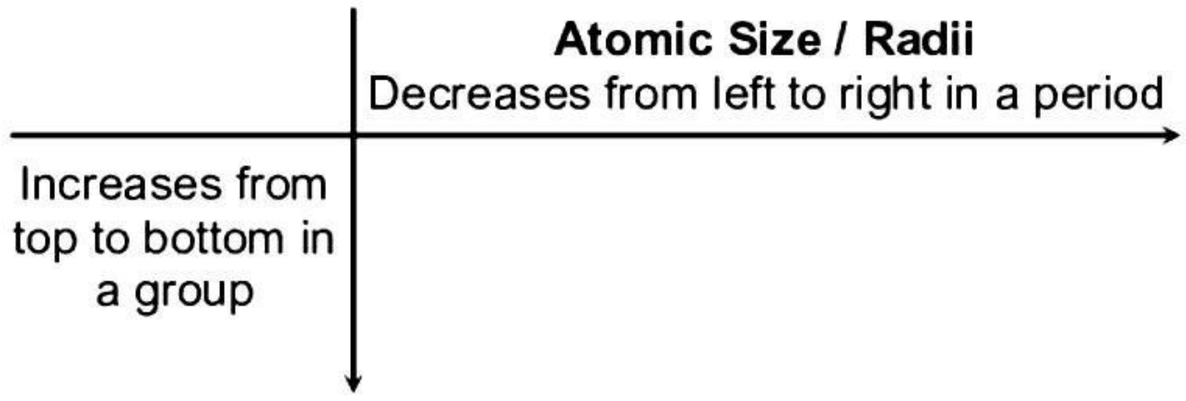
Valency

The valency of elements in a group is fixed but in a period first it increases from 1 to 4 and then decreases to zero.



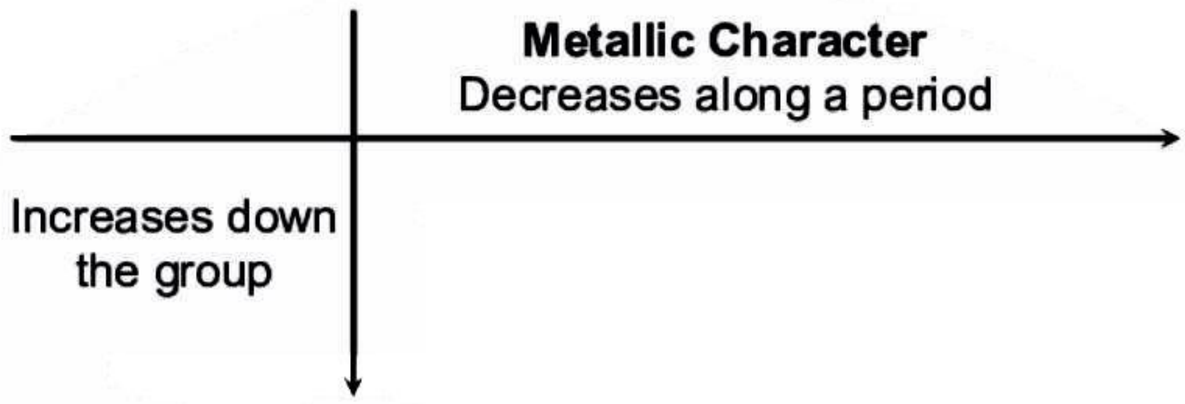
Atomic size/Atomic Radii

The atomic size decreases across a period from left to right but increases down a group.



Metallic and Non-Metallic Character

Across a period, the metallic character decreases while the non-metallic character increases. Conversely, on moving down a group, the metallic character increases while the non-metallic character decreases.



Nature of Oxides

The oxides of metals are **basic** while those of non-metals are **acidic** in nature.

The periodicity in the properties of elements such as valency, atomic size and metallic/non-metallic character can be explained on the basis of outer-shell electronic configuration of the elements.