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- Elements are classified on the basis of similarities in their properties.
- Döbereiner grouped the elements into triads and Newlands gave the Law of Octaves.
- Mendeléev arranged the elements in increasing order of their atomic masses and according to their chemical properties.
- Mendeléev even predicted the existence of some yet to be discovered elements on the basis of gaps in his Periodic Table.
- Anomalies in arrangement of elements based on increasing atomic mass could be removed when the elements were arranged in order of increasing atomic number, a fundamental property of the element discovered by Moseley.
- Elements in the Modern Periodic Table are arranged in 18 vertical columns called groups and 7 horizontal rows called periods.
- Elements thus arranged show periodicity of properties including atomic size, valency or combining capacity and metallic and non-metallic character.

Periodic Law: 'Properties of elements are a periodic function of their atomic number.'

Atomic number gives us the number of protons in the nucleus of an atom and this number increases by one in going from one element to the next. Elements, when arranged in order of increasing atomic number Z, lead us to the classification known as the Modern Periodic Table. Prediction of properties of elements could be made with more precision when elements were arranged on the basis of increasing atomic number.

Position of Elements in the Modern Periodic Table:

The Modern Periodic Table has 18 vertical columns known as 'groups' and 7 horizontal rows known as 'periods'. Let us see what decides the placing of an element in a certain group and period. All elements of a group contain same number of valence electrons, which justifies similar chemical properties.

The atomic radius decreases in moving from left to right along a period. This is due to an increase in nuclear charge which tends to pull the electrons closer to the nucleus and reduces the size of the atom.

www.ravijain.weebly.com Periodic Table IVA ٧A VΙΑ VΙΙΑ of Elements 2 C Be O 12 P Na Mg Si S CI AI. ШB IVB ٧B VIB. YIIB ΙB 20 Κ Ca Sc Ti Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr 42 43 5 Rb Sr Nb Ru Rh Pd Cd Sn Sb Te Zr Mo Ag In *La 6 Ba Au Hf Ta Re Os Pt TI Pb Bi Po Ir Rn 104 105 106 107 108 109 110 Ra +Ac *Lanthanide Pr Nd Sm Eu Gd Tb Dy Но Er Tm Yb Lu Series 95 101 102 103 92 93 94 96 97 98 99 100 + Actinide U Pa Th Series: Legend - click to find out more... H - gas Li - solid Br - liquid Tc - synthetic Transition Metals Rare Earth Metals Halogens Non-Metals Alkali Metals Alkali Earth Metals Other Metals Inert Elements

Atoms of different elements with the same number of occupied shells are placed in the same period. Na, Mg, Al, Si, P, S, Cl and Ar belong to the third period of the Modern Periodic Table, since the electrons in the atoms of these elements are filled in K, L and M shells.

Metallic & Non-metallic Properties:

Metals like Na and Mg are towards the left-hand side of the Periodic Table while the non-metals like sulphur and chlorine are found on the right-hand side. In the middle, we have silicon, which is classified as a semi-metal or metalloid because it exhibits some properties of both metals and non-metals.

In the Modern Periodic Table, a zig-zag line separates metals from non-metals. The borderline elements – boron, silicon, germanium, arsenic, antimony, tellurium and polonium – are intermediate in properties and are called metalloids or semi-metals. Metals tend to lose electrons while forming bonds, that is, they are electropositive in nature.

As the effective nuclear charge acting on the valence shell electrons increases across a period, the tendency to lose electrons will decrease. Down the group, the effective nuclear charge experienced by valence electrons is decreasing because the outermost electrons are farther away from the nucleus. Therefore, these can be lost easily. Hence metallic character decreases across a period and increases down a group.

As the trends in the electronegativity show, non-metals are found on the right-hand side of the Periodic Table towards the top. These trends also help us to predict the nature of oxides formed by

www.ravijain.weebly.com the elements because it is know that the oxides of metals are basic and that of non-metals are acidic

in general.