

AISH SLOPE TABLE : PERIODIC TABLE RE-CREATION INCORPORATING ELECTRON FILLING PATTERN IN ORBITALS

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Abstract

*In this paper a table, grouping of elements, is presented in the form of a triangular table named as **Aish Slope Table (AST)** which incorporates the distribution of elements on the basis of filling order in orbitals in an atom. This is a promising grouping because of covering the drawbacks of previously adopted periodic table. Parameters that are investigated covers anonymous positions, accommodation of a complete group of elements, periodicity in properties and few more. By including an appropriate system as similar as electron filling in an orbital it brings a rejuvenated exceptional basic step to enter the door to study chemistry and related. This paper demonstrate that there is considerable scope for theoretical realisation of the combined study of elements ,orbital energy order and the rule of electrons filling in orbitals and shells.*

1. Introduction -

(A) General Discussion

Aish Slope Table is an appealing integration of elements in a single table because it is much needed to focus on knowing the core information rather than compromising with a source of information for those core knowledge. AST is certainly appropriate for learning simultaneously about the elements and what differentiates them from representing the same quality or property. With each more electron in an orbital of any shell in an atom we get another unique element taking in care of our physical requirements in earth.

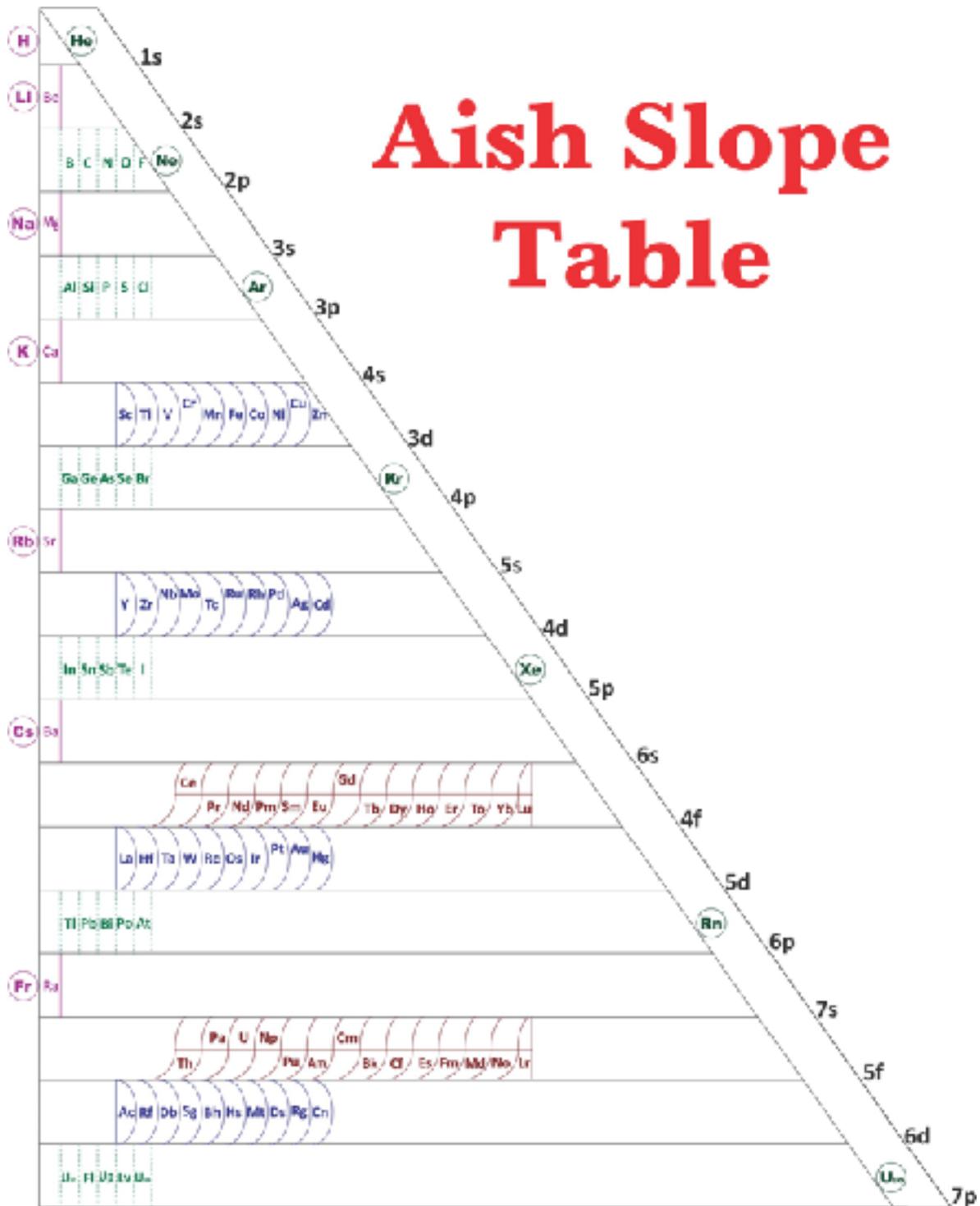
(B) Understanding AST

Aish Slope Table is a triangular shaped table. The horizontal rows are called **split orbitals (SO)** and each orbital has fixed no. of elements which can be called out distinguishably giving them the name

Nth element in that orbital. On moving from left to right the atomic no. increases. Each SO's name is represented (as preferred by **IUPAC**) on the right side of slope.

The first SO starts with the filling of the lowest level (1s) and therefore has two elements — hydrogen (1s¹) and Helium (1s²). The second SO starts with lithium and third electron enters the 2s orbital. The next element beryllium has four electrons. Starting from the next element boron, the 2p orbitals are filled with the electrons when the L shell is completed at neon (2s², 2p⁶). Thus there are 8 elements in L shell but not all in a single SO. the 4th SO (3s) begins at sodium, and the added electrons enter a 3s orbital. Successive filling of 3s and 3p SO take place. Now, 4s SO starts at potassium but next to this SO is 3d which is not surprising because according to the energy level 3d > 4s therefore placed after it. This justifies that our table is based on energy distribution of shells.

Aish Slope Table



Altogether we have 18 elements in the m shell or in combined 3s,3p,3d SOs. Hence 3s, 4s, 5s, 6s, 7s are similar to 1s and 2s. 4p,5p,6p,7p are similar to 2p and 3p. 5d,6d similar to 3d and 4d. No change

to the name of series, like transition series, actinide series, lanthanide series and others too. Its important to note that after 6s SO next energy level

is of 4f SO hence in AST both the lanthanoid series and actinide series are occupied inside the table,

after 6s and 6p SOs respectively. Right at the left of the table attached to the vertical lines the alkali metals are bubbled and at right of the table along the slope are the inert elements bubbled. Vertical groups represents the same property elements as elements in any same vertical column (must be of same type of block) have similar valence shell electronic configuration, the same number of electrons in outer orbitals and similar properties. For e.g. all H, Li, Na, K, Rb, Cs are vertically and have same number of valence electrons. Thus AST also reflects periodic dependence upon atomic mass.

It is not that AST do not represents or points out s,p,d,f blocks. justifying the grouping by the equation $AST = s + p_{1-5} + d + f + p_6$, it has elements enclosed in the blocks similar to D. These are all d—block elements and the vertical group consist of Sc, Y and La these are same property elements. Similarly this type of grouping is applicable for all the vertical listed groups. f-block elements are also similar grouped as the e.g. given for d-block elements. Hence vertically the s,p,d,f blocks are uniquely separated grouping out similar property elements.

Nomenclature of elements with atomic number > 100 are named according to the prescription by IUPAC.

(C)Why AST incorporates electronic configuration and orbital energy as a base.

Numerous forms of periodic table have been devised from time to time. Some forms emphasis chemical reactions and valence, whereas others stress the electronic configuration of elements. A modern version, the so called AST is the most convenient. In fact, it is now recognised that the periodic law is essentially the consequence of the periodic variation in electronic configuration, which indeed determine the physical and chemical properties of elements and their compounds.

(D)Assumptions

The horizontal rows are called split orbitals because each horizontal row contains double the number of blocks it has in any orbital, it is because each spin quantum number has been split separately for representation of each element uniquely. The no. of orbitals is not fixed as may increase on discovery of more elements. As it was in modern periodic table, AST does not have any of the 18 groups that were in modern periodic table.

Alkali metals and noble gases are assigned a position at the vertical and slope edge of the table respectively.

Literature: A review on Periodic Table

A periodic table is arguably the most important concept in chemistry, both in principle and in practice. It is the everyday support for students. It suggests new avenues of research to professionals, and it provides a succinct organisation of the whole chemistry. It is a remarkable demonstration of the fact that the chemical elements are not a random cluster of entities but instead display trends and lie together in families. An awareness of the periodic table is essential to anyone who wishes to disentangle the world and see how it is built up from the fundamental building blocks of the chemistry, the chemical elements. Since ages the periodic table has undergone many changes, it all started with a hypothesis and then the grouping took the face of graphs and further it was in the form of a complex not perfect table advancing into a well distributed system of groups and periods. Some of the prominent work on its evaluation are of **Antoine-Laurent de Lavoisier, Lothar Meyer (Lothar Meyer's curve), Johann Wolfgang Dobernier (Dobereiner triad) , John Newlands (Newlands' octave), Dmitri Ivanovich Mendeleev** and **Glenn Seaborg**. Although Dmitri Mendeleev is often considered the "father" of the periodic table, the work of many scientists

contributed to its present form. some of the works are-

Law of Triads

In 1817 Johann Dobereiner noticed that the atomic weight of strontium fell midway between the weights of calcium and barium, elements possessing similar chemical properties. Between 1829 and 1858 a number of scientists (**Jean Baptiste Dumas, Leopold Gmelin, Ernst Lenssen, Max von Pettenkofer, and JP Cooke**) found that these types of chemical relationships extended beyond the triad. Unfortunately, research in this area was hampered by the fact that accurate values of were not always available.

Law of Octaves

John Newlands, an English chemist, wrote a paper in 1863 which classified the 56 established elements into 11 groups based on similar physical properties, noting that many pairs of similar elements existed which differed by some multiple of eight in atomic weight. This law stated that any given element will exhibit analogous behaviour to the eighth element following it in the table.

Mendeleev's periodic law : This law states that the physical and chemical properties of the elements are the periodic function of their atomic masses. This means that when the elements are arranged in the order of their increasing atomic masses, the elements with similar properties reoccur at regular intervals. Such orderly recurring properties in a cyclic fashion are said to be occurring periodically. This is responsible for the name periodic law or periodic table.

The Modern Periodic Table

In 1913, the english physicist, **Henry Moseley** observed regularities in the characteristic x-ray spectra of the elements. He showed that atomic number is a more fundamental property of an element than its atomic mass. The last major changes to the periodic table resulted from

Glenn Seaborg's work in the middle of the 20th Century. He reconfigured the periodic table by placing the actinide series below the lanthanide series.

Driving force for project : Limitations of previous works
The foremost vision of AST is evolution i.e. the vision of discovering a better thing than the existing forces the eternal and creates a desire to innovate something really needed. As for AST is concerned, the demerits of modern periodic table acted as the factors on its creation. Namely-

(A) Position of hydrogen

(B) f-block elements outside the table

And much more small drawbacks of the table which makes us to adjust the procedure to understand it accordingly.

One of the major factor which drives towards AST is enrichment of quality education right from the beginning i.e. though the system of learning has been prescribed by qualified intellectuals but as the time takes a leap and a generation gap is a factor , those techniques needs to be revamped. AST describes it a demerit of all the periodic tables till date that they made the basic chemistry a bit complicated than what it is in real.

Objective of Aish Slope Table

AST aims to create an outstanding slope table which is capable and compatible for combined study of elements ,their electronic configuration and focuses on the orbital energy level. It also emphasises to lay a base which helps to create a combined effect in the foundation of chemistry. Hence with the help of it becomes in the range to explore the possible branches in the field and if is allowed to implement, it would open the possibilities for new discoveries and further it can be proved as the way carving factor for revolutions in theoretical chemistry and its application

Proposed table: AST

Orbital energy level and electronic configuration independently arranges elements and responsible for the periodicity in properties of elements respectively.

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