

Question # 82337

The positions of K and Ar, Co and Ni do not remain anomalous any longer since ----- is used in arranging the elements.

Answer:

The positions of K and Ar, Co and Ni do not remain anomalous any longer since the atomic number is used in arranging the elements.

Russian chemistry professor Dmitri Mendeleev and German chemist Julius Lothar Meyer independently published their periodic tables in 1869 and 1870, respectively. Mendeleev's table was his first published version; that of Meyer was an expanded version of his (Meyer's) table of 1864. They both constructed their tables by listing the elements in rows or columns in order of atomic weight and starting a new row or column when the characteristics of the elements began to repeat. Mendeleev published in 1869, using atomic weight to organize the elements, information determinable to fair precision in his time. Following the discovery, in 1911, by Ernest Rutherford of the atomic nucleus, it was proposed that the integer count of the nuclear charge is identical to the sequential place of each element in the periodic table. In 1913, Henry Moseley using X-ray spectroscopy confirmed this proposal experimentally. Moseley determined the value of the nuclear charge of each element and showed that Mendeleev's ordering actually places the elements in sequential order by the nuclear charge. Nuclear charge is identical to proton count and determines the value of the atomic number (Z) of each element. The atomic number is the absolute definition of an element and gives a factual basis for the ordering of the periodic table [1].

But some elements have atomic weight larger than atomic number. For an example, the mass of Co is larger than the mass of Ni, although nickel's atomic number is larger than the atomic number of cobalt. The same pattern is observed between K and Ar. So, if we used atomic mass for ordering elements in the periodic table, we will swap those elements. But this kind of order is wrong: it destroys periodicity of chemical properties of elements in the periodic table (alkaline element (K) in VIII group and noble gas (Ne) in I group). It is the reason why we use an atomic number of elements for ordering them in the periodic table.

Reference:

[1] https://en.wikipedia.org/wiki/Periodic_table

Answer provided by www.AssignmentExpert.com