Model Periodic Table

The Model Periodic Table is an interactive periodic table application with a quiz feature. Elements can be selected from the Periodic table by left mouse clicking on them or dragging the mouse while holding the mouse down. Information displayed includes: the atomic number (number of protons), atomic weight, state at STP (25 C), CAS RN, oxidation states and valence electron configuration along with a short description of each element.

Quiz:

Users can chose to be quizzed on symbol, name, atomic number or the family of an element. Using the advanced option setting users can restrict the quiz to one or more family of elements.

Periodic Tables and Periodic Law

The modern periodic table, based on atomic number and electron configuration, was created primarily by a Russian chemist, Dmitri Ivanovich Mendeleev, and a German physicist, Julius Lothar Meyer, both working independently. They both created similar periodic tables only a few months apart in 1869.

Mendeleev created the first periodic table based on atomic weight. He observed that many elements had similar properties, and that they occur periodically. Hence, the table's name.

His periodic law states that the chemical and physical properties of the elements vary in a periodic way with their atomic weights. The modern one states that the properties vary with atomic number, not weight.

Elements in Mendeleev's table were arranged in rows called periods. The columns were called groups. Elements of each group had similar properties.

The Periodic table can be divided into nine families of elements each having similar properties. The families include:

Alkali metals

The alkali metals, found in group 1 of the periodic table, are highly reactive metals that do not occur freely in nature. These metals have only one electron in their outer shell. Therefore, they are ready to lose that one electron in ionic bonding with other elements. As with all metals, the alkali metals are malleable, ductile, and are good conductors of heat and electricity. The alkali metals are softer than most other metals.

Alkaline metals

The alkaline earth elements are metallic elements found in the second group of the periodic table. All alkaline earth elements have an oxidation number of +2, making them very reactive.

The Transition metals

The 38 elements in groups 3 through 12 of the periodic table are called "transition metals." As with all metals, the transition elements are both ductile and malleable, and conduct electricity and heat. Their valence electrons are present in more than one shell. This is why they often exhibit several common oxidation states.

Other metals

The "other metals" elements are located in groups 13, 14, and 15. While these elements are ductile and malleable, they are not the same as the transition elements. These elements, unlike the transition elements, do not exhibit variable oxidation states, and their valence electrons are only present in their outer shell. All of these elements are solid, have a relatively high density, and are opaque. They have oxidation numbers of +3, ±4, and -3.

Metalloids

Metalloids are the elements found between the boundary that distinguishes metals from non-metals. Metalloids have properties of both metals and non-metals. Some of the metalloids, such as silicon and germanium, are semi-conductors.

Non-metals

Non-metals are the elements in groups 14-16 of the periodic table. Non-metals are not able to conduct electricity or heat very well. As opposed to metals, non-metallic elements are very brittle. The non-metals can be gases, such as oxygen and solids,

such as carbon. The non-metals have no metallic luster, and do not reflect light. They have oxidation numbers of ±4, -3, and -2.

Halogens

The halogens are five non-metallic elements found in group 17 of the periodic table. All halogens have 7 electrons in their outer shells, giving them an oxidation number of -1.

Noble gases

The noble gases are found in group 18 of the periodic table. These elements have an oxidation number of 0. This prevents them from forming compounds readily. All noble gases have 8 electrons in their outer shell, making them stable.

Rare Earth

The 30 rare earth elements are composed of the lanthanide and actinide series. One element of the lanthanide series and most of the elements in the actinide series are synthetic, that is, human-made. All of the rare earth metals are found in group 3 of the periodic table, and the 6th and 7th periods.

Feedback

Please send us your comments on this software. We would like to hear about bugs, other problems, suggested improvements, and experiments you think would work in this format.

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Also check out the Model Science Web site for new developments, down-loadable software and product information:

http://www.modelscience.com