

2.8 The Periodic Table? (1.8)

Why is the periodic table that shape?

Objectives

- Give the name and location of specific groups on the periodic table, including alkali metals, alkaline earth metals, noble gases, halogens, and transition metals.
- Explain the relationship between the chemical behavior of families in the periodic table and their electron configuration.
- Identify elements that will have the most similar properties to a given element.

Introduction

Since the families of elements were organized by their chemical behavior, it is predictable that the individual members of each chemical family will have similar electron configurations.

Families of the Periodic Table

Remember that Mendeleev arranged the periodic table so that elements with the most similar properties were placed in the same group (vertical column on the periodic table). All of the 1A (or group 1) elements have one **valence electron** (electrons that are involved in bonding). This is what causes these elements to react in the same ways as the other members of the family. The elements in 1A are all very reactive and form compounds in the same ratios with similar properties with other elements. Because of their similarities in their chemical properties, Mendeleev put these elements into the same **group**.

Group 1A is also known as the alkali metals (most reactive family of metals). Although most metals tend to be very hard, these metals are actually soft and can be easily cut.

Group 2A (2) is also called the **alkaline earth metals** (Shiny, reactive silvery-white metals). Once again, because of their similarities in electron configurations, these elements have similar properties to each other. The same pattern is true of other groups on the periodic table. Remember, Mendeleev arranged the table so that elements with the most similar properties were in the same group on the periodic table.

It is important to recognize a couple of other important groups on the periodic table by their group name. Group 7A (or 17) elements are also called halogens (most reactive nonmetals). This group contains very reactive nonmetallic elements.

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astatine (At) and radon (Rn) are both in period 6. This means that their valence electrons are in the sixth energy level. These affect the chemical properties of these elements.

Summary

- The vertical columns on the periodic table are called groups or families because of their similar chemical behavior.
- All the members of a family of elements have the same number of valence electrons and similar chemical properties.
- The horizontal rows on the periodic table are called periods.

Further Reading / Supplemental Links

- <http://go.uen.org/b6o>
- <http://go.uen.org/b6p>
- <http://go.uen.org/b6q>
- <http://go.uen.org/b6r>
- <http://go.uen.org/b6s>

Online Interactive Activities

- Graph the properties of elements and look for repeating (periodic) properties using this site: <http://go.uen.org/b6t>
- How well do you know the periodic table? Play this online game to find out: <http://go.uen.org/b6u>