

Chapter 3 The Periodic Table

3-1 Using the Periodic Table

Periodic means "repeating patterns"



Mendeleev arranged the elements by increasing atomic mass. He predicted the properties of some missing elements.

Henry Moseley listed the elements by their increasing atomic number. This solved the problems w/ Mendeleev's table.

Elements in the same group \updownarrow (or column) have similar chemical properties.

The rows are called periods. The atomic number increases as you move to the right and the physical and chemical properties change.

Metals are on the left side of the table (except for Hydrogen). Almost $\frac{3}{4}$ of the elements are metals. Non-metals are on the right side. Most are gases. Metalloids separate the metals and non-metals. They have properties of both.

3-2 Metals

Physical Properties:

- * Luster (the ability to reflect light)
- * Ductility (the ability to be pulled into a wire)
- * Malleability (the ability to be hammered into sheets)
- density
- strength
- boiling + melting points

Chemical properties vary across the table, but are similar within groups \updownarrow

Group 1: Alkali Metals

- so reactive they are stored w/o oxygen
- very soft
- found in nature as compounds
- have very low densities (Na can float)

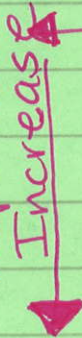
Group 2: Alkaline Earth Metals

- still quite reactive
- also found in nature as compounds
- soft and silvery
- have low densities

Group 3-12: Transition Elements

- This includes the Lanthanide and Actinide Series
- Some transition elements exist in nature as elements (not in compounds)
- These have higher densities, higher melting points, and greater strength than groups 1 and 2.
- Transition elements react less quickly with oxygen than groups 1 + 2.

Metallic Properties Increase



Metallic Properties increase across the P. Table

3-3 Nonmetals + Metalloids

- Nonmetals have no metallic properties
 - many are gases at room temperature
 - solid nonmetals are dull
 - poor conductors (or good insulators)

* Group 17: The Halogens

Halogen - an element that reacts with a metal to form "a salt."

ie: Sodium chloride; Calcium chloride

Halogens react easily, so they are found in compounds

* Group 18: The Noble Gases

- Because these elements don't form compounds well they were difficult to find

Hydrogen $\ddot{\text{H}}$

- has the smallest atomic mass
- most common element in the universe
- is considered a nonmetal

Metalloids

- have physical + chemical properties of metals and nonmetals
- * metalloids are semiconductors
- Silicon is very abundant on earth