

The Periodic Table of the Elements

Chapter 3.2

Organization of the Periodic Table

- Groups similar elements together
- Makes it easier to predict an element's properties

Organization

- The order of the elements are based on how many protons the element contains
- Example:
 - Hydrogen has 1 proton = 1st element
 - Helium has 2 protons = 2nd element

Periodic Law

- Properties of elements tend to change in a regular pattern when they are arranged in order of increasing protons

Periods

- Horizontal Rows are called periods
- Indicate how many energy levels are in the atom
- Example:
 - 1st row = 1st energy level
 - 2nd row = 2nd energy level

Periods

- As we move from left to right in one period, electrons are added.
- Example:
 - Lithium has 1 valence electron
 - Beryllium has 2 valence electrons

Groups (family)

- A vertical column of elements in the periodic table
- Elements in the same group have the same number of valence electrons
- # of valence electrons determines the chemical properties

Ionization

- The process of adding to or taking away an electron from an atom
- Group 1 elements are reactive because their outermost energy levels are not full

Ions

- Atoms with an uneven # of electrons from protons
- Has a net electric charge
- Cation: an ion with a positive charge
- Anion: an ion with a negative charge

Atomic Number (Z)

- Equals how many protons are in an atom
- Also equals the number of electrons in the atom

Mass Number (A)

- Equals the total number of protons and neutrons
- Can vary among atoms of an element

Isotopes

- Any atoms that have the same # of protons but a different # of neutrons
- Some elements have isotopes, some do not

Atomic Mass Unit (AMU)

- Atoms have a very small mass
- Used to express the relative mass of the atom
- 1 proton = 1 amu
- 1 neutron = 1 amu

Average Atomic Mass

- The average of the mass of all naturally occurring isotopes of an element
- Average is weighted, this means more common isotopes have a greater effect than less common isotopes