Section 5.2 Notes

Exploring the Periodic Table

Why do elements within a group of the periodic table have similar chemical properties? What happens to an atom that gains or loses electrons? What are the three main categories of elements?

THE ROLE OF ELECTRONS

- The periodic trends in the periodic table are the result of electron arrangement.
- Valence (outermost) electrons account for similar properties.
  - All elements in group 1 have 1 valence electron.
  - All elements in group 17 have 7 valence electrons.

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ELECTRON CONFIGURATION ON THE PERIODIC TABLE
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SUBSHELL REGIONS ON THE PERIODIC TABLE

ION FORMATION

- Ion: An neutral atom that gains or loses 1 or more electrons so it no longer has the same number of protons and electrons. This results in the atom having a net electric charge.
- Valence (outermost) electrons account for similar properties.
  - All elements in group 1 lose an electron to form a positive ion.
  - All elements in group 17 gain an electron to form a negative ion.

CLASSIFICATION OF ELEMENTS

- Elements are categorized by their properties and are either:
  - Metals – Shiny solids that can be stretched and shaped; Good conductors of heat and electricity; Examples: Gold, Platinum, Copper, Aluminum
  - Nonmetals – Solid, Liquids, or Gases; Solids are dull and brittle; Poor conductors of heat and electricity (good “insulators”); Examples: Carbon, Oxygen, Helium, Sulfur
  - Semiconductors (Metalloids) – Conductors of electricity under certain conditions; Properties between metals and nonmetals; Examples: Silicon, Germanium
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REGIONS ON THE PERIODIC TABLE

- Metals
- Metalloids
- Nonmetals