Periodic Table: Facts and Trends

Chemistry Unit 5 Module 2

Module Concepts

- Attractive Forces
 - nucleus and valence electrons
- Group Trends
 - Shielding Effect (Decreasing Coulombic attraction)
- Period Trends
 - Increasing Coulombic attraction

Periodic Trends

- There are several trends on the periodic table that are based on the position of the elements relative to each other.
- They can be across periods or within families.
 - Group trends are described from top to bottom
 - Period trends are described left to right

Reasons for Group Trends

- Shielding Effect Refers to the weakening Coulombic attraction between the positively charged atomic nucleus and the negatively charged valence electrons as you travel down a group due the addition of new energy levels.
 - Analogy: Greater distance between opposite poles of two magnets, weaker attraction between poles.

- The addition of each new energy level as you progress down the group serves as a new "shield" between the nucleus and its valence electrons, which weakens their attraction to one another.
- Look at the Bohr atomic structures for sodium and potassium on the next slide. Potassium's nucleus has a weaker pull on its valence electrons compared to sodium because it has one more energy level or "shield" between the nucleus and valence electron.

Sodium – 2 "shields" Stronger Attraction

Potassium – 3 "shields" Weaker Attraction





Reasons for Period Trends

 Increasing Coulombic attraction -Refers to the strengthening attractive force between the positively charged nucleus and the negatively charged valence electrons as you travel from left to right across a period. This happens because more protons are being added to the nucleus, but no new energy levels are being added to shield the valence electrons from the greater positive charge of the nucleus. Sodium: 11 protons, 2 "shields" = weaker attraction to valence electron

Chlorine: 17 protons, 2 "shields" = stronger attraction to valence electrons



chlorine www.webelements.com