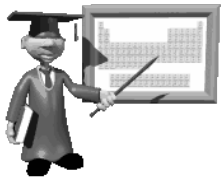
Periodic Trends



Periodic Trends

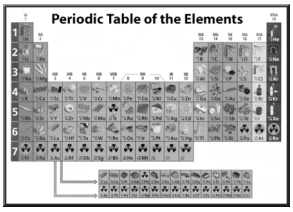
- Periodic Trends are trends that occur across the periodic table and down the periodic table

Atomic Radius

- **Atomic Radius** – size of the atom

Decreases →

Increases ↓



Atomic Radius

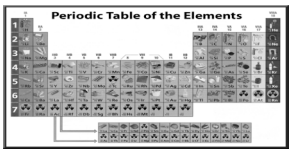
- **Radius decreases across a period**
  - **Increased effective nuclear charge due to decreased shielding**
- **Radius increases down a group**
  - **Addition of principal quantum levels**

Ionization Energy

- _____ – the energy required to remove one mole of electrons, from one mole of gaseous atoms, to produce one mole of ions

Increases →

Decreases ↓



Ionization Energy

- First ionization energy
- Second Ionization energy
- Ionization energies are measure in KJ/mol
- The have positive values showing that energy must be put in to remove an electron

Ionization Energy

- The magnitude of the ionization energy depends on 2 things…
  - The nuclear charge (how many protons are present)
  - The shielding effect of the inner electrons

Ionization Energy

- Across
- **increase** because the **nuclear charge increases** and the electrons are being removed from the same principal quantum level (shell), **experiencing no extra shielding**, and are therefore held more strongly.
- (You're trying to remove a more & more negatives, but still have the same number of positives pulling in on the electrons. They are pulling harder because there are few negatives)

Ionization Energy

- Down
- **decrease because the** outer electrons are **further away from the nucleus**
- Therefore the electrons are held less strongly.

Example

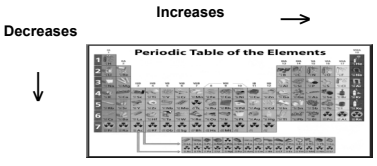
- Consider the following ionization energies

1st	2nd	3rd	4th
496	4562	6912	9543

- What is the predicted charge of this atom?

Electron affinity

- **_____ – the energy change when one mole of gaseous atoms gains one mole of electrons , to form one mole of gaseous atoms**



Electron affinity

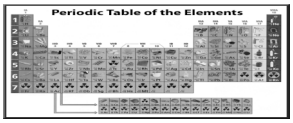
- **Affinity tends to increase across a period**
- **Affinity tends to decrease as you go down in a period**
  - **Electrons farther from the nucleus**
  - **experience less nuclear attraction**

Eelctronegativity

- _____ - A measure of the ability of an atom in a chemical compound to attract electrons

Increases →

Decreases ↓

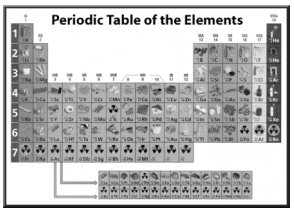


Metallic Character

- _____ – how much like a metal the element is

Decreases →

Increases ↓



Ionic Radius

- which will be larger:
- Cl or Cl^{-1}

Ionic Radius

- which will be larger:
- Na or Na^{+1}