

- State the trend and provide an explanation for the trend (why does the trend exist?).
 - Atomic Radius as you move left to right across a period (left to right).

 - Atomic Radius as you move down a group.

 - Ionization energy as you move across a period (left to right).

 - Electronegativity as you move down a group.

- How does an atom's size (atomic radius) change when it forms an ion (cation and anion)? Why does this happen?

- In each of the following questions, arrange the atoms in the order requested.
 - atomic radius*, least to greatest: Na, Mg, Na⁺, P, P³⁻

 - first ionization energy*, least to greatest: S, Cl, Se, F

 - electronegativity*, least to greatest: Al, P, Si, N

 - Circle the element with the *greatest atomic radius*.
 (1) C versus Si (2) C versus F (3) K versus K⁺ (4) N versus N³⁻

 - Circle the element with the *greatest electronegativity*.
 (1) Ba versus Mg (2) O versus F (3) Ca versus K (5) O versus N

1. State the trend and provide an explanation for the trend (why does the trend exist?).

a. Atomic Radius as you move left to right across a period (left to right).

RA ↓ As you move right across a period, nuclear charge increases as e^- are added to the same valence, resulting in stronger attraction b/w nucleus and valence e^- .

b. Atomic Radius as you move down a group.

RA ↑ As you move down to a new element in a group, the atom gains a new layer of electrons, making the atom larger.

c. Ionization energy as you move across a period (left to right).

IE ↑ Increased nuclear charge produces stronger attractive force b/w nucleus and valence e^- , so more energy is required to take away e^- .

d. Electronegativity as you move down a group.

EN ↓ Increased nuclear charge produces stronger attractive force b/w nucleus and shared e^- in a covalent bond.

2. How does an atom's size (atomic radius) change when it forms an ion (cation and anion)? Why does this happen?

When forming a cation, the size ~~increases~~ ^{decreases} b/c ~~of an extra electron~~ ^{are} removed.

When forming an anion, the size increases b/c extra electron(s) are added/gained.

3. In each of the following questions, arrange the atoms in the order requested.

a. atomic radius, least to greatest: Na, Mg, Na^+ , P, P^{3-}



b. first ionization energy, least to greatest: S, Cl, Se, F



c. electronegativity, least to greatest: Al, P, Si, N



d. Circle the element with the greatest atomic radius.

(1) C versus **(Si)** (2) **(C)** versus F (3) **(K)** versus K^+ (4) N versus **(N³⁻)**

e. Circle the element with the greatest electronegativity.

(1) Ba versus **(Mg)** (2) O versus **(F)** (3) **(Ca)** versus K (5) **(O)** versus N