

Unit 4 Test Periodic Trends

Name: 30 total points
Block: _____ Date: _____

Atomic Forces

1. In your own words, define the nuclear force and explain how it affects the atomic structure for a given period.

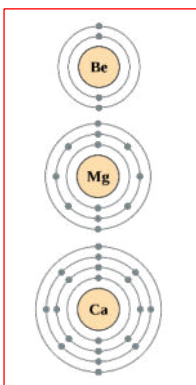
The nuclear force causes the protons to attract the electrons. The greater the number of protons and electrons the greater the inward pull on the atom, causing it to be smaller. (1 pt)

2. In your own words, define the electron-electron repulsive force and explain how affects the atomic structure for a given group.

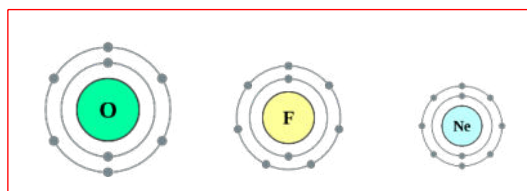
Like charges repel. So as more orbitals are added, the electron-electron repulsive forces spread out the electrons making the atomic radius larger. (1 pt)

Atomic Radius

1. Draw Bohr models of each atom to show the atomic radius trend for Be, Mg, and Ca. (3 pt)



2. Draw Bohr models of each atom to show the atomic radius trend for O, F, and Ne. (3 pt)



Ionic Radius

1. Draw Bohr models to show the ionic Radius trend for Ca and Ca^{+2} . Explain how the atom is different than the ion. Which is smaller? What type of ion was created? (1 pt atom, 1 pt ion, 1 Explanation)



The cation is smaller because it lost 2 electrons.

The cation has 3 orbitals, while the atom has 4.

2. Draw Bohr models to show the ionic radius trend for N and N^{-3} . Explain how the atom is different than the ion. Which is smaller? What type of ion was created? (1 pt atom, 1 pt ion, 1 Explanation)



The anion is larger because it has 3 more electrons.

Both atom and ion have 2 orbitals.

Ionization Energy

1. Write the abbreviated electron configuration for the **halogen** with the lowest ionization energy.

Iodine is $[\text{Kr}] 5s^2 4d^{10} 5p^5$

2. Write the full electron configuration for the noble gas with the highest ionization energy.

Helium is $1s^2$

Metallic Properties

1. Explain what it means to be ductile. Give an example of an element that **is** and that **is not** ductile.

Ductile means the ability to be stretched into a wire. Metals are ductile; nonmetals are not. [Actual answers will vary]

2. Explain what it means to be malleable. Give an example of an element that **is** and that **is not** malleable.

Malleable means the ability to be bent or hammered into a different shape. Metals are malleable; nonmetals are not. [Actual answers will vary]

Electronegativity

1. Explain which group on the periodic table has the lowest electronegativity and why.

Noble gases have the lowest electronegativity because their valence orbitals are already full.

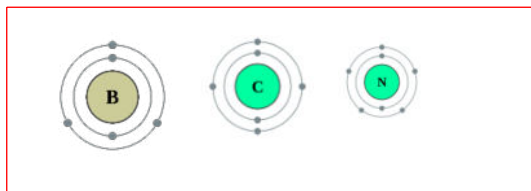
2. Explain which element on the periodic table has the highest electronegativity and why.

Fluorine has the highest electronegativity because it has the least amount of shielding, a large nuclear force, and it only needs one more electron to complete its valence orbital.

Shielding

1. Draw Bohr models of each atom to show the shielding trend for B, C, and N. Indicate how many "shields" each atom contains.

Each atom has 2 orbitals.



2. Draw Bohr models of each atom to show the shielding trend for Li, Na, and K. Indicate how many "shields" each atom contains.

