

Periodic Trends Note Taking Guide

Key

Fill in the blanks. Some blanks have word choices written after them to help you. Refer to Chapter 6 in your Chemistry textbook.

I. Atomic Radius in a Group

- A. As you move down a group, the nucleus becomes stronger (stronger, weaker) because more protons (electrons, protons) are being added to it. This stronger nucleus can pull the electrons in more tightly, making the atoms **smaller**; *however*,
- B. Electrons (Protons, Electrons) are also added to the atom but are added to larger (larger, smaller, the same) energy levels resulting in **larger** atoms.
- C. The increased number of inner electrons shield (or block) the positive (positive, negative) pull of the nucleus.
- D. So, electron shielding increases (increases, decreases) causing the electrons on the outermost energy levels to be even farther from the nucleus than expected.
- E. This causes the atoms at the bottom of a Group to be even larger (larger, smaller) than expected.
- F. Therefore, atomic radius increases (increases, decreases) as you move down a group

II. Atomic Radius in a Period

- A. As you move right across a Period, the nucleus becomes stronger (stronger, weaker) because more protons (electrons, protons) are being added to it.
- B. Electrons (Protons, Electrons) are also added but they are added to the same (the same, a larger, a smaller) energy level.
- C. This causes the amount of electron shielding from electrons on inner energy levels to remain constant (constant, varied).
- D. Therefore, electrons are pulled in more (more, less) tightly because they feel the pull from nucleus more strongly.
- E. This causes the atoms on the right of the Periodic Table to be smaller (larger, smaller) than those on the left.
- F. So, atomic radius decreases (increases, decreases) as you move across a Period from left to right.

III. Sizes of an Ion Versus Sizes of an Atom

- A. Metal cations are smaller (smaller, larger) than the neutral atoms
- B. because metals lose e^- now p^+ is greater than e^- nucleus pulls in
- C. Nonmetal anions are larger (smaller, larger) than the neutral atoms *the remaining valence e^- (less shielding)*
- D. because nonmetals gain e^- now more e^- than p^+ more shielding e^- can spread out

IV. Ionization Energy in a Group

- A. Ionization energy is the energy required to remove the outermost electron from an atom
- B. As you move down a Group, the nucleus becomes stronger (stronger, weaker) because there are more (more, fewer) protons in it.
- C. *However*, as you move down a group, there are more (fewer, more) energy levels making the atom larger (larger, smaller).
- D. In atoms at the top of a group, the outermost electrons are *closer* to the nucleus so the electrons can feel the pull of nucleus more (more, less) strongly.
- E. The outermost electrons also feel the pull of the nucleus less strongly because there is more (less, more) electron shielding from the increased (decreased, increased) number of inner electrons.
- F. Therefore, less (more, less) energy is required to remove the outermost electron from a larger atom.

- G. For these reasons, ionization energy decreases (increases, decreases) as you move down a Group

V. Ionization Energy in a Period

- A. Ionization energy is the energy required to remove the outermost electron from an atom
B. As you move to the right in the Period, the nucleus becomes stronger (stronger, weaker) because there are more (more, fewer) protons in it.
C. There are also more (more, less) electrons but they are added to the same (the same, a larger, a smaller) energy level so electron shielding from inner energy levels remains constant (constant, varied).
D. Therefore, the atoms on the right of the Table are smaller (smaller, larger).
E. For these reasons, the electrons feel the pull from the nucleus more (more, less) strongly so more (more, less) energy is required to remove an electron.
F. Therefore, ionization energy increases (increases, decreases) to the right in a Period

VI. Electronegativity in a Group

- A. Electronegativity is the ability of a nucleus to attract the electrons (electrons, protons) in a bond
B. As you move down a Group, the nucleus becomes stronger (stronger, weaker) because there are more (more, fewer) protons in it.
C. As you move up a Group, there are fewer (more, fewer) energy levels making the atom smaller.
D. There is also more (more, less) electron shielding from the increase (increased, decreased) number of inner electrons as you move down a Group.
E. As a result, the electrons in the bond feel the pull of nucleus less (more, less) strongly.
F. For these reasons, electronegativity decreases (increases, decreases) down a Group

VII. Electronegativity in a Period

- A. Electronegativity is the ability of a nucleus to attract the electrons (electrons, protons) in a bond
B. As you move to the right in the Period, the nucleus becomes stronger (stronger, weaker) because there are more (more, fewer) protons in it.
C. As you move to the right in a Period, electrons are also being added but they are added to the same (the same, a larger, a smaller) energy level
D. so electron shielding from inner energy levels remains constant (constant, varied) resulting in a smaller (smaller, larger) atom.
E. For these reasons, the electrons in the bond feel the pull of nucleus more (more, less) strongly
F. And electronegativity increases (increases, decreases) to the right in a Period
G. Note: The noble gases (halogens, noble gases) are not included in the electronegativity trend because they don't attract or donate electrons

VIII. Electron Affinity

- A. The energy change that occurs when an electron is acquired by a neutral atom is called electron affinity.
B. Electron affinity increases (increases, decreases) to the right in a period.
C. Electron affinity decreases (increases, decreases) as you move down a group.