

Key Q's and Vocab – Electronic Configurations

Vocab:

1. **Energy shells** – energy shells (aka principle energy levels) represent a distance from the nucleus. The higher the energy shell the farther from the nucleus the electrons will be potentially found
2. **Core electrons** – electrons on the inner energy shells in an atom
3. **Valence electrons** – electrons on the outermost energy shell in the s and p subshells
4. **Shielding** – electron-electron repulsion caused by core electrons interacting with valence electrons. This repulsion decreases the overall attraction of the valence electrons to the nucleus
5. **Aufbau Principle** – as electrons are added to an atom they will fill the lowest energy level available
6. **Pauli's Exclusion Principle** – orbitals can hold a maximum of 2 electrons and each must have opposite spin since no two electrons can have the same quantum numbers
7. **Hund's Rule** – degenerate orbitals are filled one electron at a time before any electrons are paired in orbitals
8. **Degenerate orbitals** – orbitals that have identical energy (common example is p_y , p_x , p_z orbitals)
9. **Electron configuration** – method for describing the distribution of electrons in an atom
10. **Orbital notation** – electron configuration using arrows to depict electrons within orbitals
11. **Noble gas configuration** – shorthand electron configuration where core electrons are summarized using a noble gas
12. **Paramagnetic** – elements that have unpaired electrons within an orbital and will interact with a magnetic field
13. **Diamagnetic** – NO UNPAIRED ELECTRONS and therefore will not interact with a magnetic field

Key Questions:

1. Lithium and nitrogen have different first ionization energies. Explain why.
2. In terms of Coulomb's Law justify why we would predict that potassium would have a lower first ionization energy than sodium.
3. Predict which atom would have the higher amount of shielding P, S, or Se. Justify your answer in terms of atomic structure.
4. Explain any difference in energy between the valence electrons in Phosphorous and Sulfur.
5. The general trend across a period is for first ionization energies to increase for each element. Explain why Aluminum has a lower first ionization energy than Magnesium.