Name: _____ Class: _____ Date: _____ ID: A

Atomic/Bonding: Periodic Trends

How do the properties of electrons and the electron shells contribute to the periodic trends.

a. Students will be able to determine how electron shells affect the atomic radius.
b. Students will be able to determine how effective nuclear charge affects atomic radius.
c. Students will be able to determine how gaining or loosing electrons affects the atomic radius.
d. Students will be able to apply coulombs law to justify the atomic radius.
e. Students will be able to determine how effective nuclear charge affects ionization energy.
f. Students will be able to determine how gaining or loosing electrons affects the ionization energy.

1. Which atom is bigger F or Cl? Why? energy levels
2. Relative to Coulombs law, an atom who gains protons always gets smaller?
3. Relative to coulombs law an atom who gains electron (always/sometimes/never) gets (bigger/smaller). Explain your answer.
4. Which is bigger, F or F^-? Explain. electron Repulsion
5. Which atom is bigger F or Na? Explain. 1 more energy level
6. Which atom is bigger, F^- or Na^+? less protons
7. Which ion is biggest, Na^+, Mg^{2+}, or Al^{3+} less protons
8. What are the factors that affect ionization energy? # of Protons, distance away
9. Which atom on the periodic table has the smallest ionization energy? Fr
10. Which atom has the smallest ionization energy, Na, Ca, or Al? Explain. least # of P^+
11. The amount of energy needed to remove an electron can be characterized by effective nuclear charge. Look up on the Internet how to calculate effective nuclear charge(ENC). Calculate the ENC for Fluorine.
12. What is the concept of shielding? inner energy levels lowering Coulombs law of attraction.
13. What is the difference between shielding and Effective Nuclear Charge?
14. shielding = blocking e^- // ENC = $\uparrow P^+$ at a given distance = more attraction (e-level)
    a) Write the chemical reaction for the second ionization for Fe?

$$Fe \xrightarrow[1st]{} Fe^{+1} + 1e^- \Rightarrow Fe^{+1} \xrightarrow[2nd]{} Fe^{+2} + 1e^-$$

    b) write the chemical reaction for the third ionization for Fe?

$$Fe^{+2} \longrightarrow Fe^{+3} + 1e^-$$

    c) What happens to ionization energy as you remove successive electrons? Why? increase, smaller.
15. Which elements on the periodic table are likely to ionize to form cations? Why?

metals