

Ionization Energy

1. What is ionization energy?
2. If the **ionization energy is high**, then it is relatively (**easy, hard**) to remove an electron from the atom.
3. As the atomic radius increases (down a column/family), the ionization energy gets (**lower, higher**). **Explain** this trend in terms of distance between the valence electrons and the nucleus, and amount of shielding by core electrons.
4. Moving left to right in a period/row, the ionization energy gets (**lower, higher**). **Explain** this trend in terms of effective nuclear charge (Z_{eff}) and atomic radius.
5. In general, do metals or non-metals have higher ionization energy? Why?
6. Which element has higher ionization energy: C or O? Why?
7. Which element has higher ionization energy: Na or Rb? Why?

Electronegativity

8. What is electronegativity?
9. If the **electronegativity is high**, then it is attracts electrons (**weakly, strongly**).

10. As the atomic radius increases (down a column/family), the electronegativity gets **(lower, higher)**. **Explain** this trend in terms of distance between the valence electrons and the nucleus, and amount of shielding by core electrons.
11. Moving left to right in a period/row, the electronegativity gets **(lower, higher)**. **Explain** this trend in terms of effective nuclear charge (Z_{eff}) and atomic radius.
12. In general, do metals or non-metals have higher electronegativity? Why?
13. Which family of elements is an exception to that generalization? Why?
14. If **Na and Cl** bonded together to form NaCl, which atom would attract the electrons more strongly? Why?
15. If **Mg and O** bonded together to form MgO, which atom would attract the electrons more strongly? Why?

Summary

16. For each of the following properties, indicate whether fluorine or bromine has a larger value
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|----------------------|----------------------|
| a. electronegativity | c. atomic radius |
| b. ionic radius | d. ionization energy |
17. Sketch a simplified periodic table and use arrows and labels to indicate period and group trends in atomic and ionic radii, ionization energies, electronegativities, and metallic and nonmetallic character.