

## Worksheet 4

1. Explain the following variations in atomic or ionic radii:
  - a.  $\text{I}^- > \text{I} > \text{I}^+$
  - b.  $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{Be}^{2+}$
  - c.  $\text{Fe} > \text{Fe}^{2+} > \text{Fe}^{3+}$
2. Using only the periodic table, arrange each set of atoms in order of increasing radius:
  - a. Ca, Mg, Be
  - b. Ga, Br, Ge
  - c. Al, Tl, Si
3. **a.** What is meant by the term effective nuclear charge? **b.** How does the effective nuclear charge experienced by the valence electrons of an atom vary going from left to right across a period of the periodic table?
4. Which will experience the greater effective nuclear charge, the electrons in the  $n = 3$  shell in Ar or the  $n = 3$  shell in Kr? Which will be closer to the nucleus?
5. Based on their positions in the periodic table, predict which atom of the following pairs will have the larger first ionization energy:
  - a. Cl, Ar
  - b. Be, Ca
  - c. K, Co
  - d. S, Ge