Chemistry Name: _____

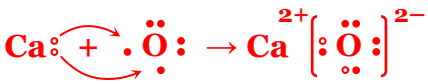
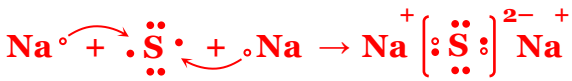
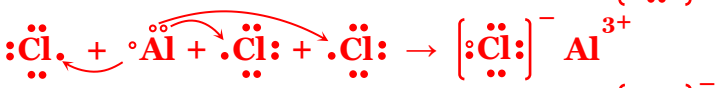
Section _____ IONIC BONDING WS Date: _____

Ionic Bonding

Ionic bonds occur when metal atoms transfer electrons to nonmetallic atoms. The resulting cations and anions form very strong bonds. This process can be illustrated using Lewis Dot diagrams.

Example: magnesium and chlorine 

Show the transfer of electrons and the resulting ionic compounds in the following problems.

1. K + Br 
2. Ca + O 
3. Na + S 
4. Al + Cl 
5. Ca + F 

Answer the following questions.

1. Why do elements in the same group on the Periodic Table tend to react similarly?

   Elements in the same group have the same number of valence electrons so they behave similarly.

2. What atomic feature does a Lewis dot structure represent best?

   Lewis dot structures best represent the valence electrons.

   (They are also quite good at predicting the correct bonding in compounds.)

3. What electron configuration do atoms tend to attain due to its stability?

   An octet of electrons because it is a stable electron configuration.

4. Describe the process when a chlorine atom becomes an ion.

   As a nonmetal, chlorine will gain one electron, become a negative ion, and its radius will increase in size.

5. What is a valence electron and where is it found?

   A valence electron is any electron found in the outermost electron shell (the valence shell).

6. Describe the four steps involved in ionic bond formation.

   An electron (or some electrons) are transferred from a metal atom to a nonmetal atom.
   The metal atom becomes a positive ion and the nonmetal atom becomes a negative ion.
   The oppositely charged ions attract each other.
   An ionic bond is formed.

7. Ions can be positive or negative. What is the charge on an ionic compound?

   The oppositely charged ions must occur in the correct ratios to balance the charges and form a neutral compound.

8. Describe ionic bonds. Do they tend to be strong or weak?

   Ionic bonds have positive nuclei attracting the bonding electrons between them plus the added power of the coulombic attraction (+ attracts –) so they are *very* strong bonds.

9. Do the melting points of ionic compounds tend to be high or low? What state would you expect an ionic compound to be at STP?

   Ionic compounds have very high melting points and so they would form solids at STP.

10. What ΔEN would you expect for an ionic bond?

    The difference in electronegativity is usually greater than 1.7 in ionic compounds.