

# Ionic Compounds

## Reviewing Vocabulary

Match the definition in Column A with the term in Column B.

### Column A

- \_\_\_\_\_ 1. Electrons that are free to move in metals
- \_\_\_\_\_ 2. For a monatomic ion, is equal to the charge
- \_\_\_\_\_ 3. The force that holds two atoms together
- \_\_\_\_\_ 4. A charged particle containing more than one atom
- \_\_\_\_\_ 5. A positively charged ion
- \_\_\_\_\_ 6. A negatively charged ion
- \_\_\_\_\_ 7. An ionic compound whose aqueous solution conducts electricity
- \_\_\_\_\_ 8. The name for most ionic compounds other than oxides
- \_\_\_\_\_ 9. Represents the way electrons exist in metals
- \_\_\_\_\_ 10. A charged particle containing only one atom
- \_\_\_\_\_ 11. The energy needed to separate the ions of an ionic compound
- \_\_\_\_\_ 12. The electrostatic force that holds oppositely charged particles together
- \_\_\_\_\_ 13. A mixture of elements that has metallic properties
- \_\_\_\_\_ 14. A mixture formed when small atoms fill holes in a metallic crystal
- \_\_\_\_\_ 15. A polyatomic ion composed of an element bonded to at least one oxygen atom
- \_\_\_\_\_ 16. Shows the simplest ratio of ions in an ionic compound
- \_\_\_\_\_ 17. The attraction of a metallic cation for delocalized electrons

### Column B

- a. alloy
- b. anion
- c. cation
- d. chemical bond
- e. delocalized electrons
- f. electrolyte
- g. electron sea model
- h. formula unit
- i. interstitial alloy
- j. ionic bond
- k. lattice energy
- l. metallic bond
- m. monatomic ion
- n. oxidation number
- o. oxyanion
- p. polyatomic ion
- q. salts

## Understanding Main Ideas (Part A)

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized term to make it true.

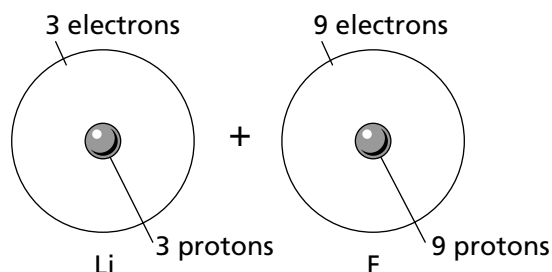
- \_\_\_\_\_ 1. The overall charge of a formula unit for a compound is *never* zero.
- \_\_\_\_\_ 2. In a crystal lattice, each positive ion is surrounded by *negative* ions.
- \_\_\_\_\_ 3. Delocalized valence electrons are typical of *ionic compounds*.
- \_\_\_\_\_ 4. A sulfate ion contains *fewer* oxygen atoms than a sulfite ion does.
- \_\_\_\_\_ 5. *Metals* tend to be malleable and ductile and to have relatively high melting points.
- \_\_\_\_\_ 6. The more *negative* the lattice energy is, the stronger is the force of attraction between the ions of an ionic compound.
- \_\_\_\_\_ 7. In naming ionic compounds, the *cation* is named first.
- \_\_\_\_\_ 8. When a metal reacts with a nonmetal, the metal tends to *gain* electrons.
- \_\_\_\_\_ 9. In naming a monatomic anion, the suffix *-ide* is used.
- \_\_\_\_\_ 10. The prefix *per-* is used in naming the anion with the most oxygen atoms.

Circle the letter of the word or phrase that best completes the statement or answers the question.

11. What is the electron configuration for the noble gases other than helium?  
 a.  $ns^2np^6$                       b.  $ns^2$                               c.  $ns^2np^3$                               d.  $ns^2np^2$
12. How many outermost *d* electrons are there in an ion that has achieved a pseudo-noble gas configuration?  
 a. none                              b. five                                  c. eight                                  d. ten
13. The anion that has the formula  $ClO^-$  is called the  
 a. chloride ion.                      b. chlorate ion.                      c. hypochlorite ion.                      d. perchlorate ion.
14. Where does a subscript that indicates the number of atoms appear, relative to a chemical symbol in a formula?  
 a. to the upper left                      b. to the lower left                      c. to the upper right                      d. to the lower right
15. What is the formula of calcium phosphate, which is made up of the ions  $Ca^{2+}$  and  $PO_4^{3-}$ ?  
 a.  $Ca_3PO_4$                               b.  $Ca_6PO_4$                               c.  $Ca_3(PO_4)_2$                               d.  $Ca_2(PO_4)_3$
16. Which of the following is an example of an interstitial alloy?  
 a. brass                                  b. 14-carat gold                                  c. carbon steel                                  d. sterling silver

### Understanding Main Ideas (Part B)

The diagram on the right represents a lithium atom (group 1 of the periodic table) and a fluorine atom (group 17). Use the diagram to answer the questions that follow.



1. What is the electron configuration of the neutral lithium atom? \_\_\_\_\_
2. What is the electron configuration of the neutral fluorine atom? \_\_\_\_\_
3. What happens to the lithium atom when it reacts with the fluorine atom? What is the electron configuration of the lithium after the change?  
\_\_\_\_\_
4. In terms of the electron arrangement, why is this change favorable for the lithium atom?  
\_\_\_\_\_
5. What happens to the fluorine atom when it reacts with the lithium atom? What is the electron configuration of the fluorine after the change?  
\_\_\_\_\_
6. In terms of the electron arrangement, why is this change favorable for the fluorine atom?  
\_\_\_\_\_
7. What kind of compound is formed in the reaction? \_\_\_\_\_
8. What always happens to one or more electrons during a reaction that forms such a compound?  
\_\_\_\_\_
9. What are the formula and name of the product in this reaction? \_\_\_\_\_
10. What holds the atoms together in the compound?  
\_\_\_\_\_
11. What is the name for the overall three-dimensional solid structure that samples of such compounds form? How are the particles generally arranged in such a structure?  
\_\_\_\_\_  
\_\_\_\_\_
12. How do the physical properties of such compounds differ from those typical of metals?  
\_\_\_\_\_  
\_\_\_\_\_