5-1 Structure and Properties of Ionic Compounds

1. Why do ionic compounds ordinarily have such high melting and boiling points?

2. The electron configurations for a lithium atom is 1s^2 2s^1. The configuration for an iodine atom is 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^10 4p^6 5s^2 4d^10 5p^5. Write the electron configurations for the ions that form lithium iodide, a substance used in photography.

3. Although metals and salts have similar lattice structures, metals make good materials for electrical wiring. Why aren't salts used instead?

5-2 Formulas and Nomenclature

4. Why is the strontium nitrate found in roadside emergency flares represented as Sr(NO_3)_2 rather than SrN_2O_6?

5. Give formulas for the following compounds:
   a. aluminum fluoride (used in ceramics)
   b. magnesium oxide (an antacid)
   c. calcium sulfide (used in luminous paints)
   d. strontium bromide (an anticonvulsant)
   e. cadmium (II) bromide (used in engraving)
   f. lithium sulfate (an antidepressant)
   g. magnesium dihydrogen phosphate (used to make wood fireproof)

6. Explain what is wrong with each of the following chemical formulas:
   a. RbCl_2
   b. Ge_{12}S_{24}
   c. NaCs
   d. NaNe

7. How many atoms of each element are contained in a single formula unit of iron (III) formate, Fe(CHO_2)_{3}H_2O, a compound used as a preservative in fodder?

5-3 Molecular Mass and Percentage Composition

8. What is the molar mass of:
   a. calcium carbonate (chalk)
   b. iron pyrite, FeS_2 ("fool's gold")
   c. aluminum chloride

9. Some antacids use compounds of calcium, a mineral that is often lacking in the diet. What is the percentage composition of calcium carbonate, a common antacid ingredient?

10. Magnetite is an iron ore with natural magnetic properties. It contains 72.4% Fe and 27.6% O. What is the formula for magnetite?

11. Which iron ore has more pure iron per kilogram of ore, Fe_2O_3 or Fe_3O_4?
1. Propose a reason why magnesium forms Mg$^{2+}$ ions and not Mg$^{6-}$ ions.

2. Which has a greater potential energy, a noble gas or a metal? Explain your answer.

3. A classmate insists that sodium gains a positive charge when it becomes an ion because it gains a proton. Explain this student’s error.

4.