

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 $\text{Sr}(\text{NO}_3)_2$ 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. $\text{Ge}_{12}\text{S}_{24}$
 - c. NaCs
 - d. NaNe
7. How many atoms of each element are contained in a single formula unit of iron (III) formate, $\text{Fe}(\text{CHO}_2)_3 \cdot \text{H}_2\text{O}$, 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.
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