

Chemical Naming Introduction

A **chemical formula** is a shorthand method for representing a chemical compound. A formula consists of a collection of chemical symbols, telling the kinds and numbers of atoms present in the compound. In many cases the chemical formula for a compound can be predicted by knowing the combining tendencies (**valences or oxidation numbers**) of the elements involved. In writing formulas, it is helpful to know that, in some situations, certain groups of atoms tend to stay together and behave as if they were individual atoms. Such groups of atoms are known as **radicals or polyatomic ions**. You will need to study a table common ions in order to write correct chemical formulas.

Two major classes of compounds occur in nature, they are:

1. Ionic Compounds: Compounds that contain **ions** (electrically charged particles formed from atoms that have gained or lost electrons) are called ionic compounds. Ionic compounds have only **empirical formulas**. An empirical formula indicates the simplest whole number ratio in which the atoms of the elements are present in the compound. Binary ionic compounds are compounds formed from two elements. One of the two elements is a metal and the other a nonmetal. Positive ions are called **cations**, while negative ions are called **anions**. In a formula, the positive ion is written first and the negative ion is written second.

The names of ionic compounds come from the names of the ions that make up the compounds. The positive ion is named first, and the negative second. The Stock System is a newer system for naming ions of metals that form two kinds of ions.

2. Molecular Compounds: Many compounds are made up of molecules rather than ions. Usually compounds formed from two nonmetals are molecular. Molecular compounds can have both empirical and **molecular formulas**. Sometimes the empirical and molecular formula are the same. For example, carbon dioxide is a molecular compound. Its molecular formula, CO_2 , is also an empirical formula. Binary molecular compounds sometimes use a prefix system for their naming.

A number of different prefixes and suffixes are used to write formulas and name binary acids, ternary acids, the series of polyatomic ions formed from chlorine and oxygen, and the acids that are derived from these polyatomic ions.