

Covalent-Network Compounds

As you read in Chapter 6, some covalent compounds do not consist of individual molecules. Instead, each atom is joined to all its neighbors in a covalently bonded, three-dimensional network. There are no distinct units in these compounds, just as there are no such units in ionic compounds. The subscripts in a formula for a covalent-network compound indicate the smallest whole-number ratio of the atoms in the compound. Naming such compounds is similar to naming molecular compounds. Some common examples are given below.

SiC	SiO ₂	Si ₃ N ₄
silicon carbide	silicon dioxide	trisilicon tetranitride

Acids and Salts

An *acid* is a distinct type of molecular compound about which you will read in detail in Chapter 14. Most acids used in the laboratory can be classified as either binary acids or oxyacids. *Binary acids* are acids that consist of two elements, usually hydrogen and one of the halogens—fluorine, chlorine, bromine, iodine. *Oxyacids* are acids that contain hydrogen, oxygen, and a third element (usually a nonmetal).

Acids were first recognized as a specific class of compounds based on their properties in solutions of water. Consequently, in chemical nomenclature, the term *acid* usually refers to a solution in water of one of these special compounds rather than to the compound itself. For example, *hydrochloric acid* refers to a water solution of the molecular compound hydrogen chloride, HCl. Some common binary and oxyacids are listed in **Table 5**.

Many polyatomic ions are produced by the loss of hydrogen ions from oxyacids. A few examples of the relationship between oxyacids and oxyanions are shown below.

sulfuric acid	H ₂ SO ₄	sulfate	SO ₄ ²⁻
nitric acid	HNO ₃	nitrate	NO ₃ ⁻
phosphoric acid	H ₃ PO ₄	phosphate	PO ₄ ³⁻

TABLE 5 Common Binary Acids and Oxyacids

HF	hydrofluoric acid	HNO ₂	nitrous acid	HClO	hypochlorous acid
HCl	hydrochloric acid	HNO ₃	nitric acid	HClO ₂	chlorous acid
HBr	hydrobromic acid	H ₂ SO ₃	sulfurous acid	HClO ₃	chloric acid
HI	hydriodic acid	H ₂ SO ₄	sulfuric acid	HClO ₄	perchloric acid
H ₃ PO ₄	phosphoric acid	CH ₃ COOH	acetic acid	H ₂ CO ₃	carbonic acid

