Important Nonsilicate Minerals

Nonsilicate minerals are typically divided into groups, based on the negatively charged ion or complex ion that the members have in common (TABLE BELOW). For example, the *oxides* contain the negative oxygen ion , which is bonded to one or more kinds of positive ions. Thus, within each mineral group, the basic structure and type of bonding is similar. As a result, the minerals in each group have similar physical properties that are useful in mineral identification. Although the nonsilicates make up only about 8 percent of Earth’s crust, some minerals, such as gypsum, calcite, and halite, occur as constituents in sedimentary rocks in significant amounts. Furthermore, many others are important economically. Table BELOW lists some of the nonsilicate mineral groups and a few examples of each. A brief discussion of a few of the more common nonsilicate Some of the most common nonsilicate minerals belong to one of three classes of minerals—the carbonates , the sulfates, and the halides. The carbonate minerals are much simpler structurally than the silicates. This mineral group is composed of the carbonate ion and one or more kinds of positive ions. The two most common carbonate minerals are *calcite,* CaCO3 (calcium carbonate), and *dolomite,* CaMg(CO3)2 (calcium/magnesium carbonate). Because these minerals are similar both physically and chemically, they are difficult to distinguish from each other. Both have a vitreous luster, a hardness between 3 and 4, and nearly perfect rhombic cleavage. They can, however, be distinguished by using dilute hydrochloric acid. Calcite reacts vigorously with this acid, whereas dolomite reacts much more slowly. Calcite and dolomite are usually found together as the primary constituents in the sedimentary rocks limestone and dolostone. When calcite is the dominant mineral, the rock is called *limestone,* whereas *dolostone* results from a predominance of dolomite. Limestone has many uses, including as road aggregate, as building stone, and as the main ingredient in Portland cement. Two other nonsilicate minerals frequently found in sedimentary rocks are *halite* and *gypsum.* Most nonsilicate mineral classes contain members that are prized for their economic value. This includes the oxides, whose members hematite and magnetite are important ores of iron. Also significant are the sulfides, which are basically compounds of sulfur (S) and one or more metals. Examples of important sulphide minerals include galena (lead), sphalerite (zinc), and chalcopyrite (copper). In addition, native elements, including gold, silver, and carbon (diamonds), plus a host of other nonsilicate minerals—fluorite (flux in making steel), corundum (gemstone, abrasive), and uraninite (a uranium source)—are important economically

