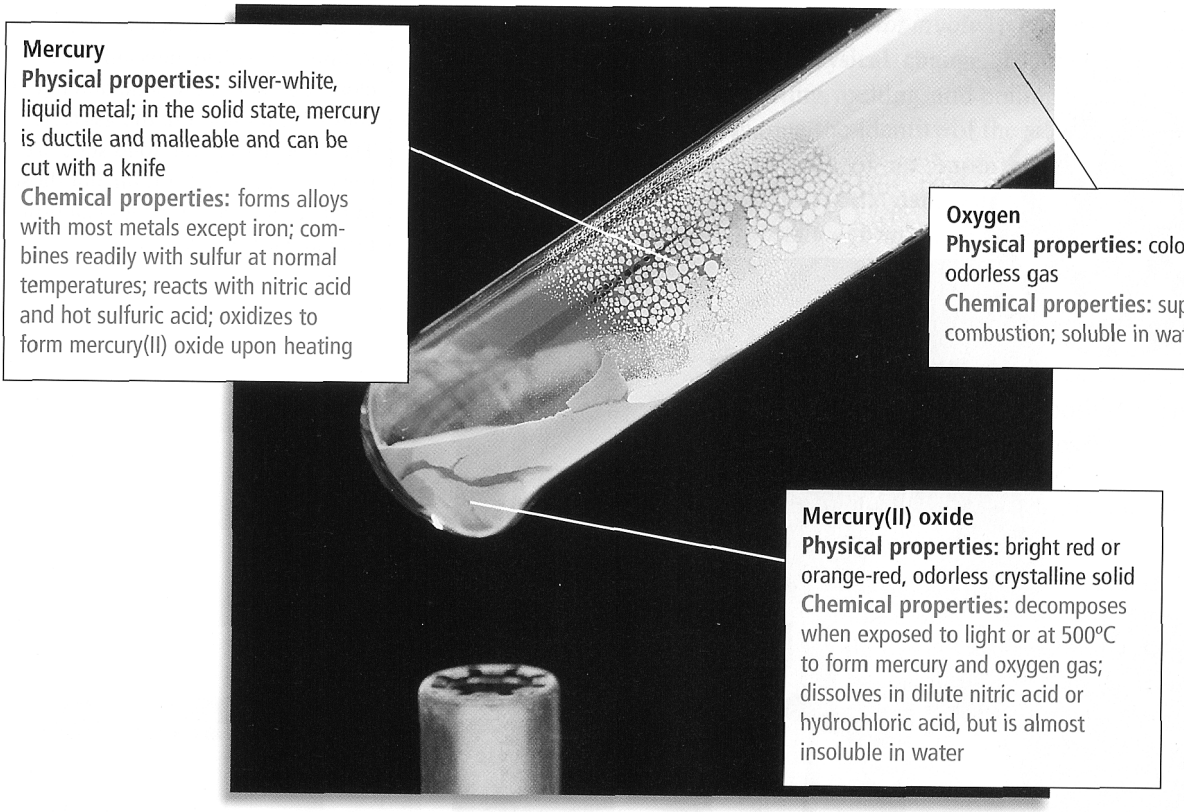

FIGURE 1-7 When mercury(II) oxide is heated, it decomposes to form oxygen gas and mercury (which can be seen on the side of the test tube). Decomposition is a chemical change that can be observed by comparing the properties of mercury(II) oxide, mercury, and oxygen.

The decomposition of the mercury compound shown in Figu can be expressed as follows:

$$\text{mercury(II) oxide} \longrightarrow \text{mercury} + \text{oxygen}$$

Chemical changes and reactions, such as combustion and decor tion, form products whose properties differ greatly from those reactants. However, chemical changes do not affect the total amo matter present before and after a reaction. The amount of matte therefore the total mass, remains the same.

Energy and Changes in Matter

When physical or chemical changes occur, energy is always inv The energy can take several different forms, such as heat or Sometimes heat provides enough energy to cause a physical char in the melting of ice, and sometimes heat provides enough ene cause a chemical change, as in the decomposition of water vap form oxygen gas and hydrogen gas. But the boundary between ph and chemical changes isn't always so clear. For example, while chemists would consider the dissolving of sucrose in water to be a ical change, many chemists would consider the dissolving of table water to be a chemical change. As you learn more about the stru of matter, you will better understand why the boundaries be chemical and physical changes can be confusing.