Pearson

Chapter 19
Electrochemistry

Lightning is a massive flow of electrical charge from the base of a thundercloud to the ground. In a battery, charge flows in a more controlled fashion but is driven by the same principle.

> "... each metal has a certain power, which is different from metal to metal, of setting the electric fluid in motion ..."
>
> —*Alessandro Volta (1745–1827)*

Learning Outcomes

SOME CHEMICAL REACTIONS RESULT IN THE TRANSFER OF ELECTRONS from one substance to another. We first encountered these kinds of reactions—called oxidation–reduction or redox reactions—in Chapter 8. In an oxidation–reduction reaction, one substance loses electrons and another substance gains them. If we physically separate the reactants in an oxidation–reduction reaction from one another, we can force the electrons to travel through a metal wire in order to get from one reactant to the other. The moving electrons constitute an electrical current. In this way, we can employ the electron-gaining tendency of one substance and the electron-losing tendency of another to force electrons to move through a wire to create electricity. The end result is a battery—a portable source of electrical current. The generation of electricity from spontaneous redox reactions (such as those that occur in a battery) and the use of electricity to drive nonspontaneous redox reactions (such as those that occur in gold or silver plating) are examples of electrochemistry, the subject of this chapter.