Introduction to Electrochemistry

SECTION 1

OBJECTIVES

- Identify parts of an electrochemical cell and their functions.
- Write electrode half reactions for cathodes and anodes.

Oxidation-reduction reactions involve energy changes. Because these reactions involve electron transfer, the net *release* or net *absorption* of energy can occur in the form of electrical energy rather than as heat. This property allows for a great many practical applications of redox reactions. *The branch of chemistry that deals with electricity-related applications of oxidation-reduction reactions is called* **electrochemistry.**

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Electrochemical Cells

Oxidation-reduction reactions involve a transfer of electrons. If the two substances are in contact with one another, a transfer of energy as heat accompanies the electron transfer. In **Figure 1** a zinc strip is in contact with a copper(II) sulfate solution. The zinc strip loses electrons to the copper(II) ions in solution. Copper(II) ions accept the electrons and fall out of solution as copper atoms. As electrons are transferred between zinc atoms and copper(II) ions, energy is released as heat, as indicated by the rise in temperature.

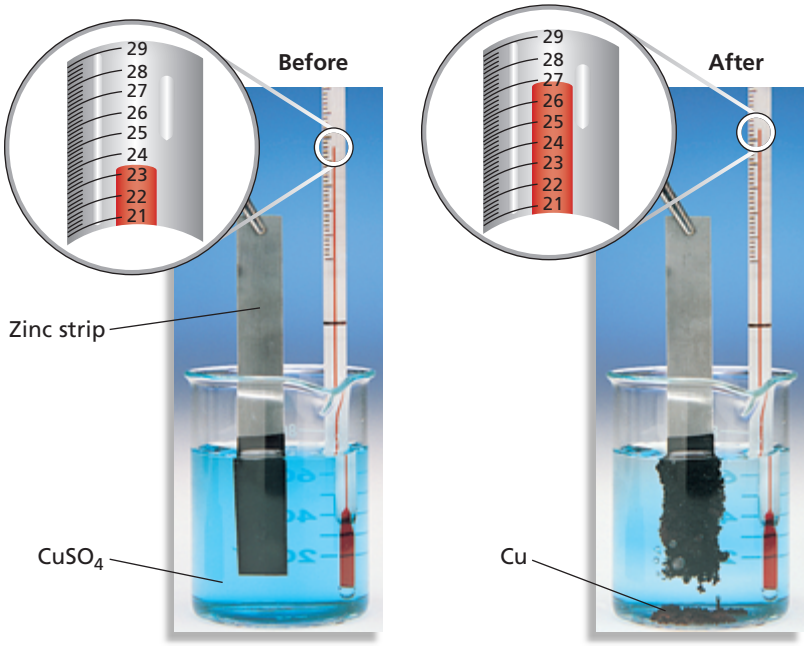

FIGURE 1 Energy as heat given off when electrons are transferred directly from Zn atoms to Cu^{2+} ions causes the temperature of the aqueous $CuSO_4$ solution to rise.