

20.1

THE MEANING OF OXIDATION AND REDUCTION

Section Review

Objectives

- Define *oxidation* and *reduction* in terms of the loss or gain of oxygen or hydrogen and the loss or gain of electrons
- State the characteristics of a redox reaction and identify the oxidizing agent and reducing agent

Vocabulary

- oxidation-reduction reactions
- redox reactions
- oxidation
- reduction
- reducing agent
- oxidizing agent

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

Oxidation–reduction, or 1, reactions are an important **1.** _____
 category of chemical reactions. Oxidation is considered to be any **2.** _____
 shift of electrons 2 from an atom. Reduction includes any **3.** _____
 shift of electrons 3 an atom. An oxidation reaction is always **4.** _____
 accompanied by a 4 reaction. The substance that does the **5.** _____
 oxidizing (the 5 agent) is 6. The substance that does **6.** _____
 the reducing (the 7 agent) is 8. **7.** _____
8. _____

Part B True-False

Classify each of these statements as *always true, AT*; *sometimes true, ST*; or *never true, NT*.

- _____ **9.** Reduction is the complete or partial gain of electrons by a substance.
- _____ **10.** In the reaction $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$, sodium is the reducing agent.
- _____ **11.** In the reaction $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$, sodium is being reduced.

_____ 12. To protect an iron ship hull, you should attach a metal that is easily reduced.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A

- _____ 13. combustion
- _____ 14. oxidation
- _____ 15. oxidizing agent
- _____ 16. corrosion
- _____ 17. zinc
- _____ 18. gold

Column B

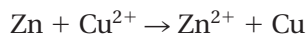
- a. a metal that loses electrons easily
- b. complete or partial loss of electrons or gain of oxygen
- c. oxidation of metals to metallic ions by oxygen and water in the environment
- d. a metal that resists corrosion
- e. a chemical change in which oxygen reacts with another substance, often producing energy in the form of heat and light
- f. a substance that accepts electrons in a redox reaction

Part D Questions and Problems

Answer the following in the space provided.

19. Define *oxidation* and *reduction* in terms of the loss or gain of electrons.

20. In the equation given, identify the substance oxidized, the substance reduced, the oxidizing agent, and the reducing agent.



21. Explain how putting a block of zinc or aluminum on the iron hull of a large ship will protect the ship from corrosion.
