

## 7.3

**BONDING IN METALS****Section Review****Objectives**

- Model the valence electrons of metal ions
- Describe the arrangement of atoms in a metal
- Explain the importance of alloys

**Vocabulary**

- metallic bonds
- alloys

**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.

Metals consist of closely packed   1   that are surrounded **1.** \_\_\_\_\_  
 by a sea of   2  . This arrangement constitutes the   3   **2.** \_\_\_\_\_  
 bond. The electron mobility accounts for the excellent **3.** \_\_\_\_\_  
  4   conductivity of metals and helps explain why **4.** \_\_\_\_\_  
 metals are   5   and   6  . Metal atoms are commonly **5.** \_\_\_\_\_  
 packed in a   7   cubic, a   8   cubic, or a   9   **6.** \_\_\_\_\_  
 arrangement. When two or more elements, at least one of which **7.** \_\_\_\_\_  
 is a metal, are mixed together, the resulting mixture is called **8.** \_\_\_\_\_  
 an   10  . **9.** \_\_\_\_\_  
**10.** \_\_\_\_\_

**Part B True-False**

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

- \_\_\_\_\_ 11. In a body-centered cubic structure, each atom has 12 neighbors.
- \_\_\_\_\_ 12. Metallic objects are formed from pure metals.

- \_\_\_\_\_ 13. Metals that are good conductors of electricity are said to be ductile.
- \_\_\_\_\_ 14. Drifting valence electrons insulate cations from one another and contribute to the malleability of a metal.
- \_\_\_\_\_ 15. Metals are good conductors of electricity because electrons can flow freely in them.

### Part C Matching

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

#### Column A

#### Column B

- |                              |  |
|------------------------------|--|
| _____ 16. ductile            | a. an alloy whose component atoms are different sizes                  |
| _____ 17. metallic bonds     | b. a mixture of two or more elements, at least one of which is a metal |
| _____ 18. alloy              | c. can be hammered or forced into shapes                               |
| _____ 19. malleable          | d. can be drawn into wires   |
| _____ 20. interstitial alloy | e. the attraction of valence electrons for positive metal ions         |

### Part D Questions and Problems

Answer the following in the space provided.

21. Explain the physical properties of metals, using the theory of metallic bonding.

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22. Explain why the properties of alloys are generally superior to their constituent components.

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