

5.4 Metallic Bonding

Honors Integrated Science

Problem Set

Name _____ Per. _____ Date _____

Directions: Use the online ck12 reading, which is posted on the class website, to help you answer the following questions.

True/False: Write (T) for true and (F) for false on the line provided.

- _____ 1. Special bonds form in metals that do not form in other classes of elements.
- _____ 2. A metallic lattice is more rigid than an ionic crystal.
- _____ 3. Metallic bonds explain some of the unique properties of metals.
- _____ 4. Metal ions form bonds with the valence electrons around them.
- _____ 5. Examples of metals include iron, zinc, and carbon.
- _____ 6. A metallic lattice is held together by ionic bonds.
- _____ 7. Iron is stronger than steel.
- _____ 8. Most metal objects are made of alloys.
- _____ 9. Bronze is a compound of copper and tin.
- _____ 10. Gold jewelry is usually made of pure gold.

Multiple-Choice: Write the letter of the correct choice on the line provided.

- 1. _____ Which statement about metallic bonds is true?
 - a. They form between metals and nonmetals.
 - b. They form between negative and positive ions.
 - c. They form a lattice-like structure.
 - d. two of the above
- 2. _____ Which statement is true about all metals?
 - a. They have one valence electron.
 - b. They have freely moving electrons.
 - c. They have more electrons than protons.
 - d. They always gain electrons.
- 3. _____ Because of metallic bonds, metals
 - a. are good conductors of electricity.
 - b. can change shape without breaking.
 - c. are ductile and malleable.
 - d. all of the above

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4. _____ An alloy is a
- a. pure metal.
 - b. compound of two or more metals.
 - c. solid solution.
 - d. mixture of nonmetals.
5. _____ Metal ions are surrounded by a “sea” of
- a. electrons.
 - b. positive ions.
 - c. negative ions.
 - d. positive charges.
6. _____ The alloy that contains iron, carbon, nickel, and chromium is called
- a. stainless steel.
 - b. bronze.
 - c. brass.
 - d. gold.

Matching: Match each definition with the correct term.

Terms:

- | | | | |
|----------|------------------|---------------------|-----------|
| a. alloy | b. metallic bond | c. metal | d. cation |
| e. iron | f. steel | g. metallic lattice | |

Definitions

- _____ 1. type of ion a metal forms
- _____ 2. structure formed by metallic bonding
- _____ 3. example of an alloy
- _____ 4. any element that is a good conductor of electricity
- _____ 5. example of a metal
- _____ 6. mixture of a metal with one or more other elements
- _____ 7. force of attraction between a metal ion and valence electrons it shares with other ions of the metal

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Fill-In: Fill in the blank with the appropriate term on the line provided.

Terms: electrons, carbon, positive, copper, malleable, bronze, ductile

1. Metal ions always have a(n) _____ electric charge.
2. Metals have freely moving _____ .
3. A substance that is _____ can be shaped into wires.
4. A substance that is _____ can be shaped into thin sheets.
5. Steel is a mixture of iron and small amounts of _____ .
6. The first alloy ever made was _____ .
7. Brass is an alloy of _____ and zinc.