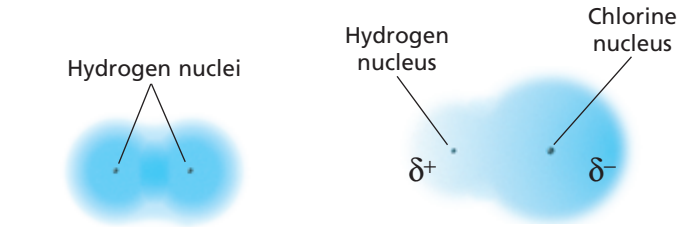

(a) Nonpolar-covalent bond **(b)** Polar-covalent bond

FIGURE 3 Comparison of the electron density in (a) a nonpolar, hydrogen-hydrogen bond and (b) a polar, hydrogen-chlorine bond. Because chlorine is more electronegative than hydrogen, the electron density in the hydrogen-chlorine bond is greater around the chlorine atom.

SAMPLE PROBLEM A

Use electronegativity differences and Figure 2 to classify bonding between sulfur, S, and the following elements: hydrogen, H; cesium, Cs; and chlorine, Cl. In each pair, which atom will be more negative?

SOLUTION

From **Figure 20** on page 161, we know that the electronegativity of sulfur is 2.5. The electronegativities of hydrogen, cesium, and chlorine are 2.1, 0.7, and 3.0, respectively. In each pair, the atom with the larger electronegativity will be the more-negative atom.

Bonding between sulfur and	Electronegativity difference	Bond type	More-negative atom
hydrogen	2.5 – 2.1 = 0.4	polar-covalent	sulfur
cesium	2.5 – 0.7 = 1.8	ionic	sulfur
chlorine	3.0 – 2.5 = 0.5	polar-covalent	chlorine

PRACTICE

Answers in Appendix E

Use electronegativity differences and **Figure 2** to classify bonding between chlorine, Cl, and the following elements: calcium, Ca; oxygen, O; and bromine, Br. Indicate the more-negative atom in each pair.

extension

Go to **go.hrw.com** for more practice problems that ask you to classify bonds.

Keyword: HC6BNDX

SECTION REVIEW

1. What is the main distinction between ionic and covalent bonding?
2. How is electronegativity used in determining the ionic or covalent character of the bonding between two elements?
3. What type of bonding would be expected between the following atoms?
   a. Li and F
   b. Cu and S
   c. I and Br
4. List the three pairs of atoms referred to in the previous question in order of increasing ionic character of the bonding between them.

Critical Thinking

5. **INTERPRETING CONCEPTS** Compare the following two pairs of atoms: Cu and Cl; I and Cl.
   a. Which pair would have a bond with a greater percent ionic character?
   b. In which pair would Cl have the greater negative charge?
6. **INFERRING RELATIONSHIPS** The isolated K atom is larger than the isolated Br atom.
   a. What type of bond is expected between K and Br?
   b. Which ion in the compound KBr is larger?