

## CHAPTER TWO

### Molecules and Ions

**2.28** What is the difference between an atom and a molecule?

**2.29** What are allotropes? Give an example. How are allotropes different from isotopes?

**2.30** Describe the two commonly used molecular models.

**2.31** Give an example of each of the following: (a) a monatomic cation, (b) a monatomic anion, (c) a polyatomic cation, (d) a polyatomic anion.

**2.32** Identify the following as elements or compounds:  
NH<sub>3</sub>, N<sub>2</sub>, S<sub>8</sub>, NO, CO, CO<sub>2</sub>, H<sub>2</sub>, SO<sub>2</sub>.

**2.33** Give two examples of each of the following: (a) a diatomic molecule containing atoms of the same element, (b) a diatomic molecule containing atoms of different elements, (c) a polyatomic molecule containing atoms of the same element, (d) a polyatomic molecule containing atoms of different elements.

**2.34** Give the number of protons and electrons in each of the following common ions: Na<sup>+</sup>, Ca<sup>2+</sup>, Al<sup>3+</sup>, Fe<sup>2+</sup>, I<sup>-</sup>, F<sup>-</sup>, S<sup>2-</sup>, O<sup>2-</sup>, and N<sup>3-</sup>.

**2.35** Give the number of protons and electrons in each of the following common ions: K<sup>+</sup>, Mg<sup>2+</sup>, Fe<sup>3+</sup>, Br<sup>-</sup>, Mn<sup>2+</sup>, C<sup>4-</sup>, Cu<sup>2+</sup>.

**2.36** What is wrong with or ambiguous about the phrase “four molecules of NaCl”?

**2.37** Which of the following are elements, which are molecules but not compounds, which are compounds but not molecules, and which are both compounds and molecules? (a) SO<sub>2</sub>, (b) S<sub>8</sub>, (c) Cs, (d) N<sub>2</sub>O<sub>5</sub>, (e) O, (f) O<sub>2</sub>, (g) O<sub>3</sub>, (h) CH<sub>4</sub>, (i) KBr, (j) S, (k) P<sub>4</sub>, (l) LiF