

CHAPTER FOUR

Atomic Mass

- 4.1** What is an atomic mass unit? Why is it necessary to introduce such a unit?
- 4.2** What is the mass (in amu) of a carbon-12 atom? Why is the atomic mass of carbon listed as 12.01 amu in the table on the inside front cover of this book?
- 4.3** Explain clearly what is meant by the statement “The atomic mass of gold is 197.0 amu.”
- 4.4** What information would you need to calculate the average atomic mass of an element?
- 4.5** The atomic masses of $^{35}_{17}\text{Cl}$ (75.53 percent) and $^{37}_{17}\text{Cl}$ (24.47 percent) are 34.968 amu and 36.956 amu, respectively. Calculate the average atomic mass of chlorine. The percentages in parentheses denote the relative abundances.
- 4.6** The atomic masses of ^6_3Li and ^7_3Li are 6.0151 amu and 7.0160 amu, respectively. Calculate the natural abundances of these two isotopes. The average atomic mass of Li is 6.941 amu.
- 4.7** What is the mass in grams of 13.2 amu?
- 4.8** How many amu are there in 8.4 g?
- 4.9** The atomic mass of element X is 33.42 amu. A 27.22-g sample of X combines with 84.10 g of another element Y to form a compound XY. Calculate the atomic mass of Y.
- 4.10** A certain metal oxide has the formula MO where M denotes the metal. A 39.46-g sample of the compound is strongly heated in an atmosphere of hydrogen to remove oxygen as water molecules. At the end, 31.70 g of the metal is left over. If O has an atomic mass of 16.00 amu, calculate the atomic mass of M and identify the element.
- 4.11** In the formation of carbon monoxide, CO, it is found that 2.445 g of carbon combine with 3.257 g of oxygen. What is the atomic mass of oxygen if the atomic mass of carbon is 12.01 amu?