

Exercise 35

Problems 35 and 36 require some knowledge of chemical notation.

Write the chemical equation $\text{CO} + \text{H}_2\text{O} = \text{H}_2 + \text{CO}_2$ as an equation in ordered triples (x_1, x_2, x_3) , where x_1, x_2, x_3 are the number of carbon, hydrogen, and oxygen atoms, respectively, in each molecule.

Solution

$$\begin{aligned}\text{CO} + \text{H}_2\text{O} &= \text{H}_2 + \text{CO}_2 \\ (1, 0, 1) + (0, 2, 1) &= (0, 2, 0) + (1, 0, 2) \\ (1, 2, 2) &= (1, 2, 2)\end{aligned}$$

This shows that the number of atoms present is the same before and after the chemical reaction.