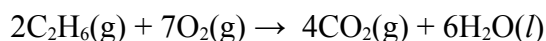


**CHM 110**  
**Limiting Reactant / Percent Yield**  
**Sample Problem**

Problem

The combustion of ethane (C<sub>2</sub>H<sub>6</sub>) in molecular oxygen (O<sub>2</sub>) produces water and carbon dioxide. If 32.0 grams of ethane is reacted with 32.0 grams of molecular oxygen, 11.7 grams of water are collected. What is the percent yield of the reaction? The reaction is given below.



Solution

*This is a limiting reactant problem. First, find out how much water could be produced from both of the given reactants.*

$$32.0 \text{ g C}_2\text{H}_6 \times \frac{\text{mol C}_2\text{H}_6}{30.07 \text{ g C}_2\text{H}_6} \times \frac{6 \text{ mol H}_2\text{O}}{2 \text{ mol C}_2\text{H}_6} \times \frac{18.02 \text{ g H}_2\text{O}}{\text{mol H}_2\text{O}} = 57.5 \text{ g}$$

$$32.0 \text{ g O}_2 \times \frac{\text{mol O}_2}{32.00 \text{ g O}_2} \times \frac{6 \text{ mol H}_2\text{O}}{7 \text{ mol O}_2} \times \frac{18.02 \text{ g H}_2\text{O}}{\text{mol H}_2\text{O}} = 15.4 \text{ g H}_2\text{O}$$

*Since the oxygen runs out when 15.4 grams of water are produced, oxygen is the limiting reactant. The theoretical yield of water, then, is 15.4 grams. Now calculate the percent yield.*

$$\frac{11.7 \text{ g}}{15.4 \text{ g}} \times 100\% = \mathbf{76.0\%}$$