

- 3 COMPUTE** Use the periodic table to compute the molar masses of HF and SnF₂.

$$1 \text{ mol HF} = 20.01 \text{ g}$$

$$1 \text{ mol SnF}_2 = 156.71 \text{ g}$$

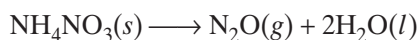
$$30.00 \text{ g HF} \times \frac{1 \text{ mol HF}}{20.01 \text{ g HF}} \times \frac{1 \text{ mol SnF}_2}{2 \text{ mol HF}} \times \frac{156.71 \text{ g SnF}_2}{1 \text{ mol SnF}_2} = 117.5 \text{ g SnF}_2$$

- 4 EVALUATE** The answer is correctly rounded to four significant figures. The units cancel to leave g SnF₂, which matches the unknown. The answer is close to an estimated value of 120.

PRACTICE

Answers in Appendix E

1. Laughing gas (nitrous oxide, N₂O) is sometimes used as an anesthetic in dentistry. It is produced when ammonium nitrate is decomposed according to the following reaction.



- How many grams of NH₄NO₃ are required to produce 33.0 g N₂O?
 - How many grams of water are produced in this reaction?
2. When copper metal is added to silver nitrate in solution, silver metal and copper(II) nitrate are produced. What mass of silver is produced from 100. g Cu?
3. What mass of aluminum is produced by the decomposition of 5.0 kg Al₂O₃?

extension

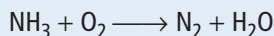
Go to **go.hrw.com** for more practice problems that ask you to calculate unknown quantities by using mole ratios.



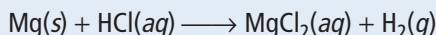
Keyword: HC6STCX

SECTION REVIEW

1. Balance the following equation. Then, given the moles of reactant or product below, determine the corresponding amount in moles of each of the other reactants and products.

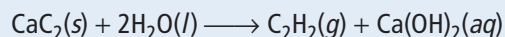


- a. 4 mol NH₃ b. 4 mol N₂ c. 4.5 mol O₂
2. One reaction that produces hydrogen gas can be represented by the following unbalanced chemical equation:



- What mass of HCl is consumed by the reaction of 2.50 moles of magnesium?
- What mass of each product is produced in part (a)?

3. Acetylene gas, C₂H₂, is produced as a result of the following reaction:



- If 32.0 g CaC₂ are consumed in this reaction, how many moles of H₂O are needed?
 - How many moles of each product would form?
4. When sodium chloride reacts with silver nitrate, silver chloride precipitates. What mass of AgCl is produced from 75.0 g AgNO₃?

Critical Thinking

5. **RELATING IDEAS** Carbon and oxygen react to form carbon monoxide: $2\text{C} + \text{O}_2 \longrightarrow 2\text{CO}$. What masses of carbon and oxygen are needed to make 56.0 g CO? Which law does this illustrate?