

**Problem Solving** *continued***COMPUTE**

$$500. \text{ g } \cancel{\text{CH}_4} \times \frac{1 \text{ mol } \cancel{\text{CH}_4}}{16.05 \text{ g } \cancel{\text{CH}_4}} \times \frac{2 \text{ mol } \text{H}_2\text{O}}{1 \text{ mol } \cancel{\text{CH}_4}} \times \frac{18.02 \text{ g } \text{H}_2\text{O}}{1 \text{ mol } \text{H}_2\text{O}} = 1.12 \times 10^3 \text{ g } \text{H}_2\text{O}$$

**EVALUATE**

Are the units correct?

Yes; mass of H<sub>2</sub>O was required, and units canceled to give grams H<sub>2</sub>O.

Is the number of significant figures correct?

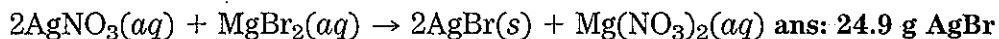
Yes; three significant figures is correct because the mass of CH<sub>4</sub> was given to three significant figures.

Is the answer reasonable?

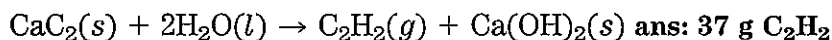
Yes; CH<sub>4</sub> and H<sub>2</sub>O have similar molar masses, and twice as many moles of H<sub>2</sub>O are produced as moles CH<sub>4</sub> burned. So, you would expect to get a little more than 1000 g of H<sub>2</sub>O.

**Practice**

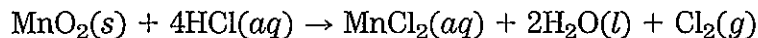
1. Calculate the mass of silver bromide produced from 22.5 g of silver nitrate in the following reaction:



2. What mass of acetylene, C<sub>2</sub>H<sub>2</sub>, will be produced from the reaction of 90. g of calcium carbide, CaC<sub>2</sub>, with water in the following reaction?



3. Chlorine gas can be produced in the laboratory by adding concentrated hydrochloric acid to manganese(IV) oxide in the following reaction:



- a. Calculate the mass of MnO<sub>2</sub> needed to produce 25.0 g of Cl<sub>2</sub>. ans: 30.7 g MnO<sub>2</sub>

- b. What mass of MnCl<sub>2</sub> is produced when 0.091 g of Cl<sub>2</sub> is generated?  
ans: 0.16 g MnCl<sub>2</sub>