



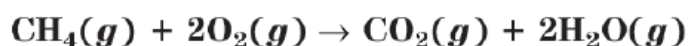
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Mass to mass

Sample Problem

Methane burns in air by the following reaction:



What mass of water is produced by burning 500. g of methane?

Solution

ANALYZE

What is given in the problem? **the mass of methane in grams**

What are you asked to find? **the mass of water produced**

Items	Data	
Substance	CH ₄	H ₂ O
Coefficient in balanced equation	1	2
Molar mass	16.05 g/mol	18.02 g/mol
Amount	? mol	? mol
Mass	500. g	? g

Step 1: Convert the mass of methane to mol.

Formula: $\text{mass of substance}/\text{molar mass} = \text{Mol}$

So: $500/16.05 = \mathbf{31.15 \text{ mol of CH}_4}$

Step 2: Do the mole to mole ratio.

For 1 mole of CH₄, 2 mol of H₂O is created. So $31.15 \times 2 = \mathbf{62.30 \text{ mol of H}_2\text{O}}$

Step 3: Convert the moles to mass

Formula: $\text{mol} \times \text{molar mass} = \text{mass substance}$

So: $62.30 \times 18.02 = \mathbf{1122.6 \text{ g of H}_2\text{O (or: } 1.12 \times 10^3 \text{ g)}}$

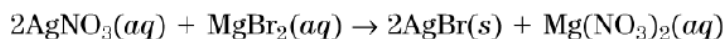


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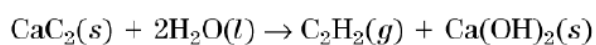
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Practice

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_2H_2 , will be produced from the reaction of 90. g of calcium carbide, CaC_2 , 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_2 needed to produce 25.0 g of Cl_2 .

- b. What mass of MnCl_2 is produced when 0.091 g of Cl_2 is generated?

UPLOAD YOUR ANSWERS FOR PEER ASSESSMENT. DISCUSS THE PROBLEMS IN THE FORUM