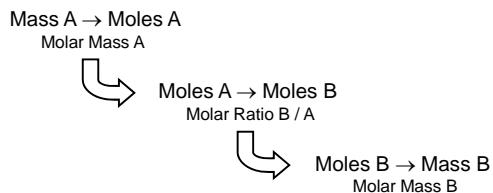


9-2 Stoichiometry

Stoichiometry involving masses:

ALL REACTANTS AND PRODUCTS ARE RELATED BY MOLES!!
Masses must be converted to and from moles using molar masses.

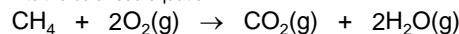


1

9-2 Stoichiometry

How many grams of H₂O are produced when 400g of CH₄ is burned?

1) Write the balanced equation

2) Convert grams of CH₄ into moles (Use molar mass of CH₄)

$$400 \text{ g CH}_4 \left[\frac{1 \text{ mol CH}_4}{16.0 \text{ g CH}_4} \right] = 25 \text{ mol CH}_4$$

3) Relate moles of CH₄ to moles of H₂O (Use molar ratio of H₂O to CH₄)

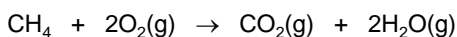
$$25 \text{ mol CH}_4 \left[\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol CH}_4} \right] = 50 \text{ mol H}_2\text{O}$$

4) Convert moles of H₂O into grams (Use molar mass of H₂O)

$$50 \text{ mol H}_2\text{O} \left[\frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right] = 900 \text{ g H}_2\text{O}$$

2

9-2 Stoichiometry

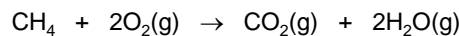
Same Problem, Less StepsHow many grams of H₂O are produced when 400g of CH₄ is burned?

$$400 \text{ g CH}_4 \left[\frac{1 \text{ mol CH}_4}{16.0 \text{ g CH}_4} \right] \left[\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol CH}_4} \right] \left[\frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right] = 900 \text{ g H}_2\text{O}$$

Mole Ratio

3

9-2 Mole – Mass Problems

Think about what you have and what you need to do!How many grams of H₂O are produced when 8 moles of CH₄ is burned?

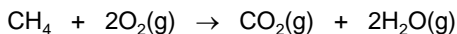
$$8 \text{ moles CH}_4 \left[\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol CH}_4} \right] \left[\frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right] = 288 \text{ g H}_2\text{O}$$

Mole Ratio

Since moles are given, you can begin with the mole ratio step.

4

9-2 Mass – Mole Problems

Think about what you have and what you need to do!How many moles of O₂ are needed for the burning of 128 g CH₄ ?

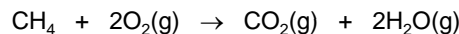
$$128 \text{ g CH}_4 \left[\frac{1 \text{ mol CH}_4}{16.0 \text{ g CH}_4} \right] \left[\frac{2 \text{ mol O}_2}{1 \text{ mol CH}_4} \right] = 16 \text{ moles O}_2$$

Mole Ratio

This problem is asking for moles. Stop after the mole ratio.

5

9-2 Mass – Mass Problems

A known amount can be used to find any other amount.126 g of water was collected from a combustion reaction. How many grams of CO₂ were produced in this same reaction?

$$126 \text{ g H}_2\text{O} \left[\frac{1 \text{ mol H}_2\text{O}}{18.0 \text{ g H}_2\text{O}} \right] \left[\frac{1 \text{ mol CO}_2}{2 \text{ mol H}_2\text{O}} \right] \left[\frac{44.0 \text{ g CO}_2}{1 \text{ mol CO}_2} \right] = 154 \text{ g CO}_2$$

Mole Ratio

6