

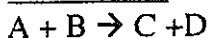
Stoichiometry Notes (Read Chapter 10 in your text book for more background)

Mole Ratio- whole number relationship of moles of one substance to moles of another substance in a balanced chemical equation

Limiting Reactant- the reactant that is used completely in a chemical reaction.

Stoichiometry- mass and mole relationships between reactants and products in a chemical rxn.

PURPOSES



1. To find the amount of substance C a given amount of A will yield.

2. To find the amount of substance B that will react with a given amount of A.

GENERAL FORMS

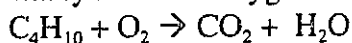
Grams A \rightarrow Mol A \rightarrow Mol B \rightarrow Grams B

$$\boxed{\text{Grams A}} \rightarrow \frac{1 \text{ mol A}}{\text{m.m. A (g)}} \rightarrow \boxed{\text{Mol A}} \rightarrow \frac{\# \text{ moles B}}{\# \text{ moles A}} \rightarrow \boxed{\text{Mol B}} \rightarrow \frac{\text{m.m. B (g)}}{1 \text{ mol B}} \rightarrow \boxed{\text{Grams B}}$$

$$\text{grams A} \times \frac{1 \text{ mol A}}{\text{m.m. A (g)}} \times \frac{\# \text{ moles B}}{\# \text{ moles A}} \times \frac{\text{m.m. B (g)}}{1 \text{ mol B}} = \text{grams B}$$

MOLES-MOLES PROBLEMS

1. How many moles of oxygen are necessary in the combustion of 7.50 moles of butane (C_4H_{10})?



Given: 7.50 mol of butane (C_4H_{10})

Asked for: moles of O_2

$$\text{moles A} \times \frac{\# \text{ moles B}}{\# \text{ moles A}} = \text{moles B}$$

(# = number of moles, coefficients, from balanced equation)

$$7.5 \text{ mol C}_4\text{H}_{10} \times \frac{13 \text{ mol O}_2}{2 \text{ mol C}_4\text{H}_{10}} = 48.75 \text{ mol O}_2$$

MASS-MASS PROBLEMS

2. How many grams of water would be produced by the combustion of 3.75 g butane?



Given: 3.75 g butane (C_4H_{10})

Asked for: grams of H_2O

$$\text{grams A} \times \frac{1 \text{ mol A}}{\text{m.m. A (g)}} \times \frac{\# \text{ moles B}}{\# \text{ moles A}} \times \frac{\text{m.m. B (g)}}{1 \text{ mol B}} = \text{grams B}$$

(m.m. = molar mass)

$$3.75 \text{ g C}_4\text{H}_{10} \times \frac{1 \text{ mol C}_4\text{H}_{10}}{58 \text{ g C}_4\text{H}_{10}} \times \frac{10 \text{ moles H}_2\text{O}}{2 \text{ moles C}_4\text{H}_{10}} \times \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 5.82 \text{ g H}_2\text{O}$$

Stoichiometry

