# Stoichiometry with gases

1. How many liters of ammonia could form if 24.2 liters of hydrogen gas were reacted with excess nitrogen gas?

a. Write the balanced chemical equation: N2 + H2 🡪 NH3

b. Use the road map to go from volume of one substance to volume of another:

1. How many molecules of carbon dioxide are formed when 6.35 liters of propane, C3H8, burn in the presence of excess oxygen?

a. Write the balanced chemical equation:

b. Use the road map to go from volume of one substance to volume of another:

1. How many molecules of oxygen are produced by the decomposition of 6.54 g of potassium chlorate (KClO3)?

$$2KClO\_{3}\_{(s)}\rightarrow 2KCl\_{(s)}+3O\_{2}\_{(g)}$$

1. Calculate the volume of sulfur dioxide, in milliliters, produced when 27.9 mL O2 reacts with carbon disulfide. (Recall that 1000 mL = 1 L).

$$CS\_{2}\_{(l)}+3O\_{2}\_{(g)}\rightarrow CO\_{2}\_{(g)}+ 2SO\_{2}\_{(g)}$$

# Part II: Limiting reagents

1. The equation below shows the incomplete combustion of ethane:

$$C\_{2}H\_{4}\_{(g)}+2O\_{2}\_{(g)}\rightarrow 2CO\_{(g)}+2H\_{2}O\_{(g)}$$

If 2.70 mol C2H4 is reacted with 6.30 mol O2,

* 1. Calculate the moles of water produced given the amounts of *each* reactant present (DO TWO CALCULATIONS!).
	2. Identify the limiting reagent based on your calculations in a.
1. Hydrogen gas can be produced by the reaction of magnesium metal with hydrochloric acid.

$$Mg\_{(s)}+2HCl\_{(aq)}\rightarrow MgCl\_{2}\_{(aq)}+ H\_{2}\_{(g)}$$

Identify the limiting reagent when 6.00 g HCl reacts with 5.00 g Mg

(*Hint*: Calculate the amount of one of the products that will be produced if you had 6.00 g HCl and plenty of Mg and then repeat the calculation for the amount of Mg given assuming you have plenty of HCl).

1. The heat from an acetylene torch is produced by burning acetylene (C2H2) in oxygen:

$$2C\_{2}H\_{2}\_{(g)}+5O\_{2}\_{(g)}\rightarrow 4CO\_{2}\_{(g)}+2H\_{2}O\_{(g)}$$

How many grams of water can be produced by the reaction of 2.40 mol C2H2 with 7.40 mol O2?