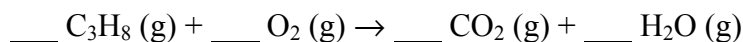
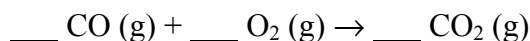


I. Gas Stoichiometry

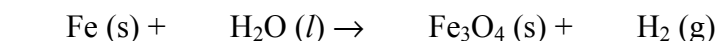
1. What volume of oxygen gas at 20.0°C and 102.6 kPa is required to produce 640. L of CO₂, also at 20.0°C and 102.6 kPa? Balance the equation first.



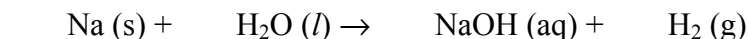
2. What volume of oxygen gas at 20.0°C and 0.953 atm is needed to react with 3.500×10³ L of CO, also at 20.0°C and 0.953 atm? First balance the equation.



3. What volume of hydrogen gas can be produced at STP by the reaction of 6.28 g of Fe according to the following equation? Balance the equation first.

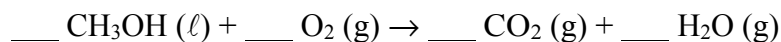


4. If 0.270 g of sodium reacts with excess water according to the following equation, what volume of hydrogen gas at STP will be produced? First balance the equation.



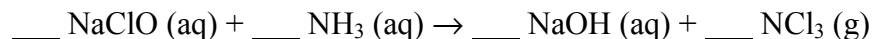
II. Theoretical & Percent Yield

5. Certain race cars can use methanol (CH₃OH) as a fuel. Liquid methanol burns in air (oxygen gas) according to the following equation. Balance the equation first.



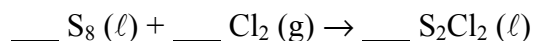
- a. What is the theoretical yield of CO₂ (in g) when 35.4 mol CH₃OH reacts with excess O₂?
- b. If 1430 g CO₂ are actually obtained, what is the percent yield (equation on Chart B)?

6. When bleach (aqueous sodium hypochlorite) is mixed with ammonia (also aqueous), it forms aqueous sodium hydroxide and the noxious gas nitrogen trichloride. Balance the equation first



- a. What is the theoretical yield of nitrogen trichloride (in g) from 2.94 g of bleach and excess ammonia?
- b. What is the percent yield if 1.35 g of nitrogen trichloride are actually isolated?

7. Disulfur dichloride (S_2Cl_2) is a liquid that plays an important role in rubber production. It is produced by reacting liquid sulfur (S_8) with chlorine gas. Balance the equation first.



If the percent yield for this reaction is 92.7%, what mass of S_8 would you need to start with to obtain an actual yield of 10.0 kg S_2Cl_2 ?

8. List the factors that can cause the percent yield to be less than 100%. What can cause the *apparent* percent yield to be greater than 100%?