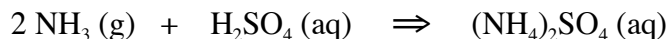


CHM 130: Stoichiometry Practice Problems

1. The fertilizer ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$, is prepared by the reaction of ammonia, NH_3 , with sulfuric acid:



- What mass of ammonium sulfate is produced if 50.0 L of ammonia gas reacts completely at STP?
 - What mass of sulfuric acid is required to react completely with 50.0 L of ammonia?
2. Propane, C_3H_8 (g), burns in oxygen to produce carbon dioxide gas and steam.
- Write the equation for this reaction, then balance the equation.
 - If 5.000 g of propane burn completely in excess oxygen, what volume of carbon dioxide gas is produced at STP?
 - If 75.0 L of steam are produced at STP, what mass of propane must have burned completely in oxygen?

3. Fermentation is a complex chemical process of making wine by converting glucose into ethanol and carbon dioxide:



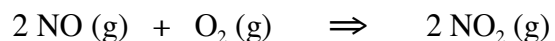
- Calculate the mass of ethanol produced if 5.00 kg of glucose decomposes completely.
 - Calculate the volume of carbon dioxide gas produced at STP if 100.0 g of glucose react completely.
4. Consider the reaction of zinc metal with hydrochloric acid.
- Write the equation for this reaction, then balance the equation.
 - Calculate the volume of hydrogen gas produced at STP if 25.00 g of zinc react with 25.00 g of hydrochloric acid.
 - Identify the limiting reagent and the reactant in excess.
 - Calculate the percent yield if 6.53 L are actually produced.

5. Titanium metal can be produced from the reduction of titanium (IV) chloride with magnesium metal:



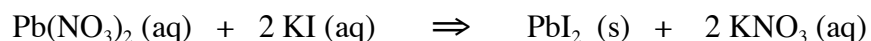
- What mass of titanium can be produced from 500.0 g of titanium (IV) chloride and 250.0 g of magnesium?
- Identify the limiting reagent and the reactant in excess.
- Calculate the percent yield if 117.0 g of titanium are actually produced.

6. Nitric oxide, NO (g), reacts with oxygen according to the following equation:



- What volume (in L) of NO₂ is produced when 80.0 L of NO reacts with 35.0 L of oxygen?
- Identify the limiting reagent and the reactant in excess.
- Calculate the percent yield of NO₂ if 68.4 L of NO₂ is actually produced.

7. Lead (II) iodide can be produced from the reaction of lead (II) nitrate and potassium iodide:



- What mass of lead (II) iodide can be produced from 100.00 g of lead (II) iodide and 75.00 g of potassium nitrate?
- Identify the limiting reagent and the reactant in excess.
- Calculate the percent yield if 89.4 g of lead (II) iodide are actually produced.