

## Stoichiometry - Sheet #1: Mass - Mass Problems

- When 142 g of calcium fluoride are reacted with an excess of sodium bromide, calculate the mass of calcium bromide formed.
- How many grams of sodium aluminate can be obtained from 7.71 g of aluminum chloride according to the reaction:  
$$\text{AlCl}_3(\text{aq}) + 4\text{NaOH}(\text{aq}) \rightarrow \text{NaAlO}_2(\text{aq}) + 3\text{NaCl}(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$$
- How many grams of carbon dioxide are obtained when 2.96 g of cerium(III) oxalate are formed according to the reaction:  
$$2\text{Ce}(\text{IO}_3)_4(\text{aq}) + 24\text{H}_2\text{C}_2\text{O}_4(\text{aq}) \rightarrow \text{Ce}_2(\text{C}_2\text{O}_4)_3(\text{aq}) + 4\text{I}_2(\text{aq}) + 42\text{CO}_2(\text{g}) + 24\text{H}_2\text{O}(\text{l})$$
- Calculate the mass of sodium permanganate that can be prepared from 1.27 g of sodium bismuthate according to the reaction:  
$$2\text{Mn}(\text{NO}_3)_2 + 5\text{NaBiO}_3 + 14\text{HNO}_3 \rightarrow 2\text{NaMnO}_4 + 5\text{Bi}(\text{NO}_3)_3 + 3\text{NaNO}_3 + 7\text{H}_2\text{O}$$
- If excess sulfuric acid is reacted with sodium hydroxide, 15.0 g of water is formed. What mass of sodium hydroxide was used?
- 50.0 g of calcium carbonate was added to excess phosphoric acid. What mass of calcium phosphate was formed?
- Calculate the mass of barium nitrate that must decompose in order to produce 112 g of oxygen.
- Calculate the mass of potassium chloride that is produced when 17.0 g of potassium carbonate reacts with hydrochloric acid.
- When "x" grams of calcium chloride was reacted with an excess of bromine, 14.0 kg of a gas was formed. Calculate "x".
- How many grams of zinc oxide are formed when 10.0 g of zinc reacts with oxygen?
- Sodium nitrate decomposes to give 3.00 g of oxygen. Calculate the mass of sodium nitrate used.
- Potassium metal reacts with 70.0 g of chlorine. Calculate the mass of product.
- Calculate the mass of magnesium oxide that must be decomposed in order to produce 48.0 g of oxygen.
- Sodium chloride was reacted with an excess of sulfuric acid to give hydrochloric acid and 142 g of a second product. What is the product, and how much sodium chloride was reacted?
- What mass of copper(I) sulfide can be produced from 9.90 g of copper(I) chloride reacting with an excess of hydrogen sulfide gas?
- How many grams of calcium hydroxide will be needed to react completely with 10.0 g of phosphoric acid?
- How many grams of hydrogen can be produced from the reaction of 72.0 g of sodium with an excess of water?
- An excess of nitrogen reacts with 6.57 g of hydrogen. How many grams of ammonia are produced?
- How many grams of oxygen are required to burn completely 84.9 g of carbon?  $\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$
- In the decomposition of potassium chlorate, 82.6 g of oxygen are formed. How many grams of potassium chloride are produced?
- The action of carbon monoxide can be expressed by the equation,  
$$\text{Fe}_2\text{O}_3(\text{cr}) + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{s}) + 3\text{CO}_2(\text{g})$$
  
What would be the minimum amount of carbon monoxide used if 80.3 g of iron were produced?
- How many grams of hydrochloric acid are required to react completely with 44.7 g of calcium hydroxide?
- How many grams of hydrogen are produced when 4.77 g of aluminum react with excess hydrochloric acid?
- Calculate the mass of lithium carbonate that must decompose to produce 78.0 g of carbon dioxide.
- How many grams of oxygen gas are formed when 100.0 g of magnesium chlorate are decomposed?
- Hydrochloric acid was reacted with zinc to produce 137 g of hydrogen gas. What mass of zinc did you begin with?