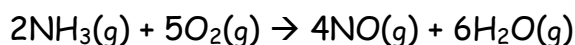


# Stoichiometry: Limiting Reagents

- A manufacturer of bicycles has 5050 wheels, 3013 frames, and 2455 handlebars.
  - How many bicycles can be manufactured using these parts?
  - How many parts of each kind are let over?
  - Which part is like a limiting reactant in that it limits the production of bicycles?
- Silver tarnishes in the presence of hydrogen sulfide, a gas that originate from the decay of food, because of the reaction:  
$$4\text{Ag} + 2\text{H}_2\text{S} + \text{O}_2 \rightarrow 2\text{Ag}_2\text{S} + 2\text{H}_2\text{O}$$
The black product, silver sulfide, is the "tarnish". If 25.00 g of silver, 5.00 g of hydrogen sulfide, and 4.00 g of oxygen are present in a reaction mixture, which one is the limiting reactant, and what mass of silver sulfide is produced?  
**FINAL ANSWER: 28.72 g of silver sulfide**
- Sulfur dioxide can be produced from the reaction of hydrogen sulfide and oxygen as shown by the following reaction:  $2\text{H}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{SO}_2 + 2\text{H}_2\text{O}$ 
  - How many grams of sulfur dioxide can be produced from 70.0 g of hydrogen sulfide and 125 g of oxygen.  
**FINAL ANSWER: 132 g of sulfur dioxide**
  - How many grams of excess reactant are left over after the reaction is complete?  
**FINAL ANSWER: 26 g of excess**
- What mass of hydrogen chloride gas is produced when 4.50 g of hydrogen and 140.0 g of chlorine are reacted. Which reactant is in excess and how much remains unreacted?  
**FINAL ANSWER: 144.0 g of HCl and 0.52 g remains**
- One of the steps in the commercial process for converting ammonia to nitric acid involves the conversion of ammonia to nitrogen monoxide:



In a certain experiment 2.50 g of ammonia reacts with 2.85 g of oxygen.

a) What mass of nitrogen monoxide is formed?

FINAL ANSWER: 2.14 g of NO

b) Which reactant is the limited reactant?

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c) How much of the excess reactant remains after the limiting reactant is completely consumed?

1.89 g of  $\text{NH}_3$