

Exercise 3.11

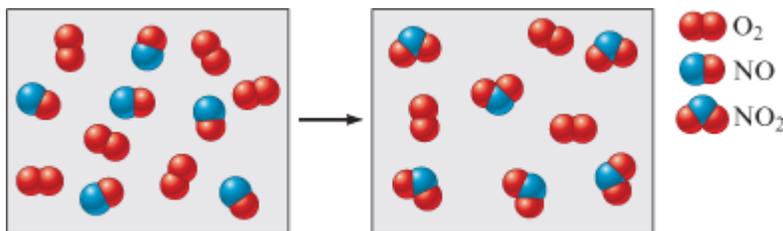
Limiting Reactants

Name: _____

Date: _____ Per: _____

DIRECTIONS: Write an equilibrium expression for each of the following. Not all equations are balanced.

1. Consider the reaction between NO(g) and O₂(g) represented below:

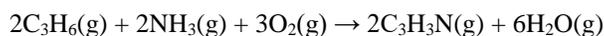


What is the balanced equation for this reaction, and what is the limiting reactant?

Balanced Equation: _____

Limiting Reactant: _____

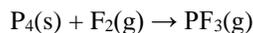
2. Acrylonitrile (C₃H₃N) is the starting material for many synthetic carpets and fabrics. It is produced by the following reaction:



If 15.0 g C₃H₆, 10.0 g O₂, and 5.00 g NH₃ are reacted, what mass of acrylonitrile can be produced, assuming 100% yield?

3. The reaction of ethane gas (C₂H₆) with chlorine gas produces C₂H₅Cl along with HCl. Calculate the percent yield of C₂H₅Cl if the reaction of 300. g of ethane with 650. g of chlorine produces 490. g of C₂H₅Cl.

4. Consider the following UNBALANCED reaction:



What mass of F₂ is needed to produce 120. g of PF₃ if the reaction has a 78.1% yield?

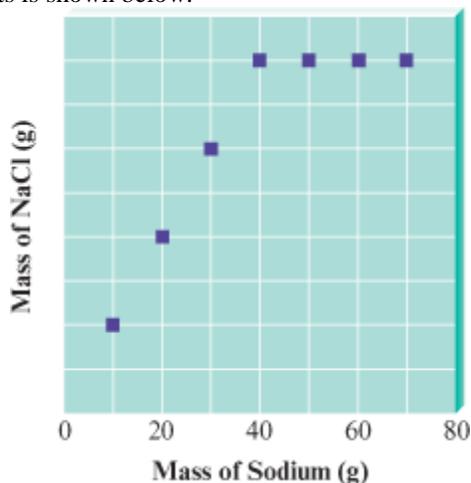
Exercise 3.11

Limiting Reactants

Name: _____

Date: _____ Per: _____

5. You have seven closed containers, each with equal masses of chlorine gas (Cl_2). You add 10.0 g of sodium to the first sample, 20.0 g of sodium to the second sample, and so on (adding 70.0 g of sodium to the seventh sample). Sodium and chlorine react to form sodium chloride. After each reaction is complete you collect and measure the amount of sodium chloride formed a graph of your results is shown below.



Answer the following questions:

- a. Write the balanced equation: _____
- b. Explain the shape of the graph. _____

- c. Calculate the mass of sodium chloride formed when 20.0 g of sodium is used.

- d. Calculate the mass of chlorine in each container.

- e. Calculate the mass of sodium chloride formed when 50.0 g of sodium is used.

- f. Identify the leftover reactant and determine its mass for parts c and e above.