**Practice: Limiting Reactants**

***Complete the following on loose leaf.***

1. The equation for the complete combustion of ethane (C2H4) is

C2H4(g) + 3 O2 🡪 2 CO2(g) + 2 H2O(g).

If 2.70 mole C2H4 is reacted with 6.30 mol of O2, identify the limiting reactant.

1. Given 3.0 moles of methane and 4.0 moles of oxygen gas, identify the limiting reactant and calculate the moles of carbon dioxide gas produced. Calculate the moles of excess reactant that remains.

CH4 + 2 O2 🡪 CO2 + 2 H2O

1. Hydrogen gas can be produced by the reaction of magnesium metal with hydrochloric acid. Identify the limiting reactant when 6.00 g HCl reacts with 5.00 g Mg.

Mg(s) + 2 HCl(aq) 🡪 MgCl2(aq) + H2(g)

1. The equation below shows the incomplete combustion of ethane.

C2H4(g) + 2 O2 🡪 2 CO2(g) + 2 H2O(g).

*(It’s not supposed to be balanced)*

If 2.70 mol C2H4 is reacted with 6.30 mol O2,

* 1. Identify the limiting reactant.
  2. Calculate the moles of water produced.

1. The heat from an acetylene torch is produced by burning acetylene (C2H2) in oxygen.

2 C2H2(g) + 5 O2(g) 🡪 4 CO2(g) + 2 H2O(g)

How many grams of water can be produced by the reaction of 2.40 mol C2H2 with 7.40 mol O2?

1. In a reaction chamber, 3.0 mol of aluminum is mixed with 5.3 mol Cl2 and reacts. The reaction is described by the following balanced chemical equation.

2 Al + 3 Cl2 🡪 2 AlCl3

* 1. Identify the limiting reactant for the reaction.
  2. Calculate the number of moles of product formed.
  3. Calculate the number of moles of excess reactant remaining after the reaction.

1. Given 5.0 mol of acetylene and 11.0 mol of oxygen gas, calculate the moles of CO2 gas produced. Calculate the moles of excess reactant that remains.

2 C2H2 + 5 O2 🡪 4 CO2 + 2 H2O

1. Given 5.0 mol of sulphur and 8.4 mol of oxygen gas, calculate the mass of SO3 gas produced. Calculate the moles of excess reactant that remains.

2 S + 3 O2 🡪 2 SO3

1. Given 0.16 g of hydrogen gas and 5.6 g of nitrogen gas, calculate the mass of HN3 produced. Calculate the mass of excess reactant that remains.

H2 + 3 N2 🡪 2 HN3

1. According to the reaction below,

AlBr3 + Cl2 🡪 Br2 + AlCl3

How many grams of aluminum chloride is produced from 82.0 g of chlorine and 175.0 g of aluminum bromide. How many grams of the excess reactant remains?

**Answers:**

1. O2 2. 2 mol CO2, 1 mol CH4 3. HCl 4a. C2H2 4b.5.4 mol H2O 5. 43.25 g H2O 6a. Al 6b. 3.00 mol AlCl3 6c. 0.80 mol Cl2 7. 8.8 mol CO2, 0.6 mol C2H2 8. 400.30 g SO3, 0.90 mol O2 9. 5.73 g HN3, 0.025 g H2 10. 87.49g AlCl3, 12.21 g Cl2