Name Class Date

**Limiting Reactants**

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Stoichiometry is the branch of chemistry that studies the amounts of reactants used and products made in chemical reactions. The first box represents contents before the reaction. The reaction shown occurs to completion. Determine the contents of the same box after the reaction stops. Remember that unreacted atoms may remain in the “after” box.

H Cl

1.

H2 + Cl2 → 2 HCl

1. Draw the contents of the box after the reaction.
2. What is the limiting reactant (reagent)?
3. What is the excess reactant? How much of the excess reactant remains?

2. O H

2 H2 + O2 → 2 H2O

1. Draw the contents of the box after the reaction.
2. What is the limiting reactant (reagent)?
3. What is the excess reactant? How much of the excess reactant remains?
4. What is the yield of the reaction?

**LIMITING & EXCESS STOICHIOMETRY PROBLEMS**

**(Chemistry 11)**

1. Lead (II) nitrate reacts with sodium iodide react to produce a solid product lead (II) iodide and sodium nitrate.

1. If 0.0830g of lead (II) nitrate solution is mixed with 0.300g sodium iodide solution, calculate the mass of the solid product made.
2. If 0.662g of lead (II) nitrate solution is mixed with 0.300g of sodium iodide solution, calculate the mass of the solid product made.

2. If 15.0g of aluminum and 72.0g of hydrochloric acid are allowed to react, determine the mass of hydrogen gas produced.

3. A mixture of 16.3g of zinc and 21.6g of bromine were heated until the reaction was completed. Calculate the mass of the product.

4. If 10.0g of powdered iron is heated with 10.0 of sulfur in an open crucible, what is the mass of iron (II) sulfide that is formed? The reaction is as follows: 8 Fe + S8 8 FeS

5. If 15.5g of aluminum is allowed to react with 46.7g of chlorine gas, calculate the mass of the product.

6. Assume 2.40 mole of oxygen gas are reacted with 2.46 mole of magnesium, determine the mole of product formed.

7. If 13.1g of potassium is reacted with 18.0g of oxygen gas, determine the mass of products made.

8. What mass of carbon dioxide is produced when 16.0g of EACH reactant, methane (CH4) and oxygen gas undergoes an oxidation reaction?

**Answers:**

1. a) Pb(NO3)2 limiting – 0.116g PbI2

b) NaI limiting – 0.461g PbI2

2. Al limiting – 1.7g H2

1. Br2 limiting – 30.4g ZnBr2
2. Fe limiting - 15.7g FeS
3. Cl2 limiting – 58.6g AlCl3
4. Mg limiting – 2.46 mol MgO
5. K limiting - 15.8g K2O
6. O2 limiting – 11.0g CO2