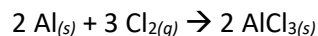


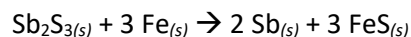
Chemistry – Chapter 12 Book problems #5: Limiting reagent, % yield

1. In a reaction chamber, 3.0 mol of aluminum is mixed with 5.3 mol Cl_2 and reacts. The following balanced chemical equation describes the reaction:



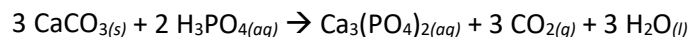
- Identify the limiting reagent for the reaction.
- Calculate the number of moles of product formed.
- Calculate the number of moles of excess reagent remaining after the reaction.

2. Heating an ore of antimony (Sb_2S_3) in the presence of iron gives the element antimony and iron (II) sulfide.



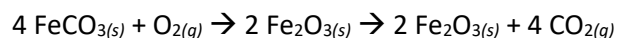
When 15.0g Sb_2S_3 reacts with an excess of Fe, 9.84 g of Sb is produced. What is the percent yield of this reaction?

3. Calcium carbonate reacts with phosphoric acid to produce calcium phosphate, carbon dioxide, and water.



- How many grams of phosphoric acid react with excess calcium carbonate to produce 3.74 g $\text{Ca}_3(\text{PO}_4)_2$?
- Calculate the number of grams of CO_2 formed when 0.773 g H_2O is produced.

4. If 75.0 g of siderite ore (FeCO_3) is heated with an excess of oxygen, 45.0 g of ferric oxide (Fe_2O_3) is produced.



What is the percent yield of this reaction?

5. Hydrazine (N_2H_4) is used as rocket fuel. It reacts with oxygen to form nitrogen and water.



- How many liters of N_2 (at STP) form when 1.0 kg N_2H_4 reacts with 1.2 kg O_2 ?
- How many grams of the excess reagent remain after the reaction?

6. The manufacture of compound F requires five separate chemical reactions. The initial reactant, compound A, is converted to compound B, compound B is converted to compound C, and so on. The diagram below summarizes the steps in the manufacture of compound F, including the percent yield for each step. Provide the missing quantities or missing percent yields. Assume that the reactant and product in each step react in a one-to-one ratio.

