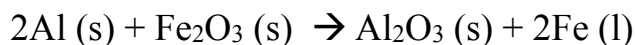


## *Stoichiometry Review Problems*

1. Aluminum reacts with bromine to form aluminum bromide. If McCloskey reacts 15.8 g of aluminum with 55.6 g of bromine in the lab.
  - a) Identify the limiting reagent
  - b) Calculate the theoretical mass of aluminum bromide.
  - c) Calculate the mass of excess reactant leftover.

2. The reaction of iron (III) oxide with powdered aluminum is known as the thermite reaction.



- a) Calculate the mass of aluminum oxide that is produced when  $1.42 \times 10^{24}$  atoms of Al react with  $\text{Fe}_2\text{O}_3$
  - b) How many molecules of iron (III) oxide are needed to react with 0.134 g of aluminum?
3. Acrylic, a common synthetic fiber, is formed from acrylonitrile,  $\text{C}_3\text{H}_3\text{N}$ . Acrylonitrile can be prepared by the reaction of propylene,  $\text{C}_3\text{H}_6$ , with nitric oxide, NO. Water vapour and nitrogen gas are also produced.



- a) What is the limiting reagent when 126 g of  $\text{C}_3\text{H}_6$  reacts with 175 g of NO?
  - b) What is the % yield if 99.9 grams of acrylonitrile was produced?
  - c) What would the theoretical yield need to be for my 99.9 grams to yield 92%?
  - d) How much of the excess reagent will remain when the reaction is complete?
4. 2.98 grams of sodium phosphate reacts with excess calcium nitrate in a double displacement reaction.
    - a) How many grams of calcium phosphate are expected to be produced?
    - b) How many grams of your other product are expected to be produced?
    - c) How many grams of calcium nitrate would cause it to become the limiting reagent?
    - d) In order to ensure that we have enough calcium nitrate, how many grams should we use in the reaction?
    - e) Has the conservation of mass been violated? Explain.