FLINN SCIENTIFIC

Name_____

Recycling Aluminum — Synthesis of Alum Worksheet

Fill in the data table and calculations:

Data Table

Mass of aluminum foil (g)	
Observations after adding the potassium hydroxide (30 seconds)	
Observations after adding the potassium hydroxide (90 seconds)	
Observations after adding 5 mL of sulfuric acid	
Observations after adding 25 mL of sulfuric acid and heating	
Mass of empty container (g)	
Mass of container with alum crystals (g)	
Mass of alum crystals (g)	

Post-Lab Questions

1. Why did the reaction of aluminum foil and potassium hydroxide start out slowly and then proceed more rapidly?

2. What is the theoretical yield of alum assuming all the aluminum metal reacted?

3. What is the percent yield obtained after running this laboratory procedure?

4. If 500 g of laboratory grade aluminum potassium sulfate cost $8.25, is it cost effective to make the aluminum potassium sulfate yourself? Consider the following data and the percent yield when determining the answer.

   Al foil costs $1.69 for a 20-sq-foot roll and 1 square foot weighs 3.75 g. Sulfuric acid solution, 3 M costs $9.80 for 500 mL.

   Potassium hydroxide solution, 3 M costs $12.80 for 250 mL.

   When calculating the answer, only consider the amount of chemicals needed and not the capital cost of the chemicals, equipment or labor time.

   Part A: What is the cost of the chemicals used to obtain the alum crystals in this experiment?

   Part B: Using the conversion factor of chemical cost (Part A) in relation to specific yield, calculate the cost of making 500.0 g of aluminum potassium sulfate.

   Part C: Is this laboratory method cost effective? Why or why not?