

Separation of a Ternary Mixture Report

Name: _____

Section: _____

Date: _____

Purpose (goal of the lab and methods used):

Unknown Number: _____

Table 1: Key gravimetric data and associated uncertainties.

	Mass (g)	Absolute uncertainty (g)	Relative uncertainty (%)
Total mass of the initial sample:			
Mass of $(\text{NH}_4)_2\text{CO}_3$			
Recovered NaCl:			
Recovered sand:			
Total recovered mass (including $(\text{NH}_4)_2\text{CO}_3$):			

Observations and related comments:

Table 2: Assessment of accuracy: % error = $100 \times (\text{experimental} - \text{accepted}) / \text{accepted}$.

	$(\text{NH}_4)_2\text{CO}_3$	NaCl	Sand
Mass % experimental results:			
Absolute mass % uncertainty:			
Accepted results:			
Percent error (include SIGN, +/-):			
Is the absolute value of the reported percent error larger or smaller than the absolute mass % uncertainty (Yes or No)?			

Post Lab Discussion Questions (answer these on a separate page – type your answers if you feel your handwritten work will be hard for your instructor to decipher).

1. For your particular accepted unknown composition, find the masses of $(\text{NH}_4)_2\text{CO}_3$, NaCl, and sand that would be present in the actual mass of the mixture you used in your experiment.
2. Calculate percent recovery using the total recovered mass and initial mass (Table 1). Was your percent recovery greater than 100% or less than 100%? Give some possible reasons why you didn't achieve exactly 100% recovery. Be specific; don't just say "human error."
3. On the first page of this report you compared the percent error in the mass % of the three components of your mixture to the uncertainties that represent the expected maximum range of error for the results based on the measuring device used (Table 2). Discuss sources of error in the procedure (other than balance errors) and relate these to lab observations (ex: color of the mixture after sublimation, sand stuck to filter paper, etc.) to support the discussion. Ideally one should compare the direction of the error observed to the direction expected based upon the lab observations (see question 4 below). It would be beneficial to provide a numerical assessment of your list of error sources.
4. If your result for % sand was higher than in the original mix (accepted value), what are possible sources for this experimental error?
5. The procedure used to separate the mixture was not optimized to provide maximum accuracy. You also completed just one trial, so we could not assess the precision of the method. Describe a minimum of three suggested improvements to the procedure that would enhance the accuracy (and / or expected precision) of the results.
6. Would you characterize this lab as conforming to the Principles of Green Chemistry? Support your answer.