

# GRAVIMETRIC ANALYSIS

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Station #: \_\_\_\_\_

**Objective:** To determine the molar mass and identity of an unknown metal carbonate using gravimetric analysis.

**Procedure:** As in CHEM 1105 lab manual, pages \_\_\_\_\_.

**Observations:**

**DATA:**

Unknown number: \_\_\_\_\_

Mass of vial & sample (g)		<del> </del>	<del> </del>
Mass of vial and $\frac{1}{2}$ sample (g)		Mass of sample for run 1	
Mass of empty vial (g)		Mass of sample for run 2	

	Run 1	Run 2
Mass of empty crucible (g)		
Mass of crucible + precipitate (g)		
<b>Mass of precipitate (g)</b>		

**CALCULATIONS:**

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**Show a full set of calculations for one run only. Write the answers only for the second run.**

i) The molar mass of calcium carbonate:

ii) The number of moles of calcium carbonate obtained:

iii) Write a balanced chemical equation, and use it to determine the number of moles of unknown metal carbonate:

iv) The molar mass (g/mol) of the unknown carbonate is:

v) The average molar mass of the unknown is (If the two molar masses do **not** agree within 10 grams, do not average them; simply report the two values):

vi) As you are told the unknown metal is an **alkali metal**, the formula of the unknown metal carbonate must be  $M_2CO_3$ . Therefore, calculate the atomic mass of the metal using the atomic masses of oxygen and carbon:

vii) Suggest the identity of the unknown metal M:

viii) Now calculate the % difference between the expected molar mass of your metal carbonate and the molar mass of the metal carbonate you obtained experimentally:

**RESULTS/CONCLUSION:**

unknown # _____	RUN 1	RUN 2	Average (or Best Value if one run had known error)
Calculated molar mass of metal carbonate _____			

**QUESTIONS:**

1. Imagine some of the solution was lost by placing a stir rod containing some of the precipitate on the counter. In what way will this affect the calculated molar mass of the metal carbonate? ***Explain by discussing if the molar mass will increase, decrease, or remain unaffected, and why, based on each step of calculations.***

2. In what way will the calculated molar mass be affected if the precipitate is **not** heated to constant mass? ***Explain as above.***

3. What chemical is being driven off as we heat a sample of calcium carbonate to a constant mass?

4. Why is the mass of the crucible not determined while it is hot?