

CHAPTER 7	Launch Lab: The Thermal Decomposition of Baking Soda	BLM 7.0.9
HANDOUT		

Baking soda and sodium bicarbonate are common names for sodium hydrogen carbonate (NaHCO_3). When baking soda is heated, such as in baking, it decomposes (thermal decomposition) to produce sodium carbonate, $\text{Na}_2\text{CO}_3(\text{s})$, carbon dioxide, $\text{CO}_2(\text{g})$, and water, $\text{H}_2\text{O}(\text{g})$.

Observe the thermal decomposition of NaHCO_3 and compare the mole relationship between reactant and products in this reaction.

Safety Precautions

Make sure to allow the crucible to cool after the reaction before you touch it.

Materials

- baking soda
- clay triangle
- retort stand
- crucible
- Bunsen burner or alcohol burner
- electronic balance
- iron ring

Procedure

1. Read the entire procedure and construct a data table to record your observations.
2. Carefully weigh a dry empty crucible. Place 2 to 3 g of baking soda in the crucible and weigh it again. Record the weight of the empty crucible and the crucible containing the baking soda.
3. Set the crucible on a clay triangle supported by an iron ring attached to a retort stand. Heat gently with a Bunsen burner (or alcohol burner) for 5 or 6 min, and then increase the heat for an additional 3 or 4 min. Be sure that the crucible is in the flame of the burner. Record your observations of what occurs during the reaction.
4. Allow the crucible and contents to cool to room temperature. Reweigh the crucible containing the product, Na_2CO_3 and record your data.

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Analysis

1. Write a balanced chemical equation for the thermal decomposition of sodium hydrogen carbonate.
2. Calculate the amount (in moles) of sodium hydrogen carbonate used and the amount of sodium carbonate produced.
3. Determine the ratio of $\frac{\text{amount of sodium hydrogen carbonate (mole)}}{\text{amount of sodium carbonate (mole)}}$.
4. What do you think is the significance of the ratio that you calculated in Question 3?