Decomposition of Sodium Bicarbonate

Background and Purpose:

Sodium bicarbonate (sodium hydrogen carbonate) decomposes at around 50 C. One of the products of the decomposition is carbon dioxide, which makes baking soda a popular ingredient in baking. Why would the production of carbon dioxide make it popular?

The other ingredients of the decomposition could be sodium hydroxide, sodium oxide and water, or sodium carbonate and water. The equations are below. Complete and balance them.

Sodium hydrogen carbonate yields sodium hydroxide + carbon dioxide

Sodium hydrogen carbonate yields sodium oxide + water + carbon dioxide

Sodium hydrogen carbonate yields sodium carbonate + water + carbon dioxide.

In the lab, determine the correct equation.

Equipment: Crucible without lid, Baking Soda, Balance, Crucible tong, scoopula, burner, ring stand, ring and clay triangle.

Determine what raw data is needed. There will be three masses. FILL THE CRUCIBLE about 1/3 FULL.

1. Mass of Empty Crucible _____ 11.00 grams
2. Mass of Crucible and $NaHCO_a$ _____ 14.13 grams
3. Mass of Crucible and Product _____ 12.97 grams

Derived data--**SHOW YOUR WORK FOR EACH BLANK.**

a. Mass of baking soda _____

b. Mass of product _____

Use the balanced equations and the mass of baking soda from blank a above, predict the mass of the three possible products.

Predicted mass of NaOH.

Change to Moles Mole Ratio Change to desired unit

Predicted mass of Na_2O

Change to Moles Mole Ratio Change to desired unit

Predicted mass of Na_2CO_3

Change to Moles Mole Ratio Change to desired unit

4. What was the actual mass of product? _____Which predicted mass (e,g,i) was the closest? _____

5. Write the correct equation for the decomposition of baking soda below: