

Vinegar and Baking Soda Stoichiometry Lab

Purpose:

To predict the amount of Carbon Dioxide gas that should be produced in a chemical reaction; then calculate the amount of CO₂ released, the percent yield.



Materials: Baking Soda (NaHCO₃), Vinegar (CH₃COOH), 2 beakers and electronic balance.

Procedure:

1. Obtain and record the mass of 100 mL beaker. This is beaker A.
2. With beaker A still on the balance, add approximately 10.0 g of baking soda to the cup. (The mass does not have to be exactly 10.0 g, as long as you record the mass accurately.)
3. Obtain and record the mass of another 100 mL beaker. This is beaker B.
4. Place beaker B on the scale, weigh and record approximately 50.0 g of vinegar. (The mass does not have to be exactly 50.0 g, as long as you record the mass accurately.)
5. Performing the reaction:
 - a. Slowly add vinegar to cup A until the reaction has stopped.
 - b. DO NOT add all of the vinegar, just enough to complete the reaction.
 - c. After the reaction is completed reweigh and record the mass of both cup A and B.
6. Calculate the mass of CO₂ that escaped.

Useful Formulas:

$$\text{Percent Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$$

$$\text{Percent Error} = \frac{(\text{Actual Yield} - \text{Theoretical Yield})}{\text{Theoretical Yield}} \times 100$$

Data:

		Data	Units
1	Mass of beaker A (empty)		
2	Mass of Beaker A + Baking Soda		
3	Mass of Baking Soda (2-1)		
4	Mass of beaker B (empty)		
5	Mass of Beaker B + Vinegar		
6	Mass of Beaker B + Vinegar after reaction		
7	Mass of Vinegar added to Beaker A (5-6)		
8	Mass of Beaker A after reaction		
9	Mass of product after the reaction (8-1)		
10	Mass of Baking Soda + Vinegar (3+7)		
11	Mass of Carbon Dioxide lost (10-9)		

Name: _____ Period: _____

Discussion Questions:

1	What are the reactants in this experiment?	
2	Which are the products in this experiment?	
3	Identify the limiting reactant:	
4	Identify the excess reactant:	
5	Using stoichiometry (i.e. mass of Baking Soda) calculate the theoretical yield of carbon dioxide:	
Show Work:		
6	What is the percent yield?	
Show Work:		
7	What is the percent error?	
Show Work:		
8	Matter cannot be created nor destroyed during a reaction. Does this apply to this lab? (Yes or No)	
Explain your answer:		