

Analysis of Baking Soda Lab

****Instructions for writeup are on the calendar*

Theory: % error formula: $\frac{\text{theoretical-experimental}}{\text{theoretical}}$
stoichiometry, pH, indicators

Purpose: To determine the mass of sodium hydrogen carbonate in a sample of baking soda using stoichiometry

Materials: Baking soda, 3 plastic cups, Soda straw, Balance, Pipets of HCl, NaOH, and thymol blue

- pH sensor (optional)

Procedure

- Measure the mass of a clean, dry plastic cup.
- Using the straw as a scoop, fill one end with baking soda to a depth of about 1 cm. Add the sample to the cup and measure its mass again.
- Place two HCl pipets that are about $\frac{3}{4}$ full into a clean cup and measure the mass of the system.
- Transfer the contents of both HCl pipets to the cup containing baking soda. Swirl until the fizzing stops. Wait 5-10 minutes to be sure the reaction is complete. Measure the mass of the two empty HCl pipets in their cup again.
- Add 5 drops of thymol blue to the plastic cup.
- Place two full NaOH pipets in a clean cup and measure the mass of the system.
- Add NaOH slowly to the baking soda/HCl mixture until the pink color just disappears. Measure the mass of the NaOH pipets in their cup again.

Data: Make a table prior to lab by reading the procedure and figuring out what important measurements are needed.

Calculations/Discussion: Using your experimental data, record the answer to the following questions below your data table.

- Write a balanced equation for the reaction between baking soda (NaHCO_3) and HCl.
- Calculate the mass in grams of the baking soda. (theoretical)
(Step B- Step A)
- Calculate the total mmol of 1M HCl.
Note: Every gram of HCl contains 1 mmol.
(Step C-Step D) x 1.00 mmol/g
- Calculate the total mmol of 0.5M NaOH.
Note: Every gram of NaOH contains 0.5 mmol.
(Step F- Step G) x 0.500 mmol/g
- Calculate the mmol of HCl that reacted with the baking soda. *Note:* The NaOH measure the amount of HCl that did not react.
(Step 3- Step 4)
- Calculate the mass of the baking soda from the reaction data. (experimental)
(0.084 g/mmol x Step 5)
- Calculate the percent error of the experiment.
 $\frac{(\text{Step 2} - \text{Step 6})}{\text{Step 2}} \times 100\%$

Conclusion:

Resources: Any Internet URL websites or textbook pages