

Determining the Concentration of CO₂ in Soda

Objective: to determine the % by mass of the CO₂ in soda, the Parts Per Million of CO₂ in soda, and then, the Molarity of the CO₂ in the soda as well.

To do this properly our plan will be as follows. Get your glassware and Bunsen burner ready (with mesh) and a thermometer. Get a scale too. You will work with 3 groups of students per can of soda (let it sit in the ice until you are ALL ready to go (patience). We need to pour the soda into the large graduated cylinders as shown. Don't lose your bubbles! Measure quickly to the nearest 10th of an mL. Then transfer the soda to your beaker, and get the mass of the soda (quickly too!). Now you can take your time. Slowly, heat the soda up to about 50°C, and use your thermometer to agitate all the carbon dioxide out of solution (careful not to spill any soda). When it's flat, mass it again. USE SOAP ON ALL GLASS to get the sticky out. Turn every thing upside down. Don't drink any soda (bad for teeth and gross). This lab is ALL ABOUT CONCENTRATIONS OF SOLUTIONS.

Procedure: READ THIS ALL FIRST then do what it says

- CLEAN and dry a 80 mL beaker
- MASS the BEAKER in grams
- SET up the BUNSEN BURNER to warm the beaker on a RING STAND with metal gauze
- GET a THERMOMETER
- Get a DRY GRADUATED CYLINDER of 100 mL in size
- POUR about 85 mL of soda CAREFULLY (lots of important bubbles) into the cylinder
- RECORD THE VOLUME of soda as accurately as possible to the nearest 10th mL
- QUICKLY and CAREFULLY transfer the soda to the beaker
- MASS BEAKER AND SODA TOGETHER, to the nearest 100th gram
- WARM the soda with Bunsen burner, NEVER let your soda temperature rise ABOVE 50°C. If your soda boils even a bit, the loss of water as steam will create enormous percent error
- Using the thermometer, stir soda carefully, we want to heat + agitate the gas out of solution
- Move the Bunsen burner aside from time to time. DO NOT RUSH.
- When CO₂ appears to be finished bubbling out, turn off Bunsen burner.
- MASS BEAKER AND SODA WITHOUT CO₂

Wash equipment and thermometers with SOAP, put everything away in proper locations.

Calculations: **SHOW FORMULAS AND WORK! Use loose leaf, Paper is cheap!**

DATA	measure with UNITS
mass beaker alone	
volume of soda	
mass beaker and soda START	
mass beaker and soda END	
Mass of the soda	
Mass of MISSING CO ₂	

Put mass of CO₂ on the board. We will omit the one highest and two lowest masses of CO₂ in soda, and get a class average for the ACTUAL VALUE.

LAB QUESTIONS:

1. Calculate your % by mass of CO₂ in the soda.
2. Calculate your MOLARITY of CO₂ that the soda has.
3. If the ACTUAL VALUE of the mass of CO₂ in soda is the class average, calculate your percent error for question #1.
4. If the grams of carbon dioxide is from the class average as calculated on the board, calculate your % Error for Molarity from question #2.
4. Calculate the PPM of CO₂ in soda.

This lab report	requires	To score these points
1	Cover page and introduction	1 + 2 = 3
data table	fill in data table	1
calculations	5 problems listed above	4 + 4 + 1 + 1 + 4 = 14
conclusion	<p>Explain what Molarity and % composition by mass is, describe this experiment and what you measured and why you measured what you did. Explain your percent error.</p> <p>Do not tell a long winded story about how you looked for equipment and found it, then how you washed it to prepare. Cut to the important FACTS.</p>	7
This lab is due on: _____		25 points total