

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Block: \_\_\_\_\_

## Soda Titration

Purpose: To calculate the acid concentration (i.e. molarity) in soda by titrating it with a base of a known molarity.

Introduction: In this lab you will analyze the acid content of various solutions. The acid content of many foods and beverages contributes significantly to their taste. Soft drinks contain varying quantities of several acids, which give sodas their tart flavor. In cola products, these acids are predominantly carbonic acid and phosphoric acid. In citrus flavored sodas, such as Sprite, Sierra Mist, and 7-Up the acids are carbonic acid and citric acid.

In this lab, 10.0 mL of soda will be titrated with 0.10 M NaOH until the equivalence point is reached. Equivalence point occurs when the exact moles base needed to completely react with all moles of acid has been added to the reaction flask. In other words, equivalence point is when the moles of acid equals the moles of base.

Since moles of acid will equal the moles of base, the following formula can be derived:

$$M_a V_a = M_b V_b$$

Where  $M_a$  is the molarity of the acid,  $V_a$  is the volume of acid,  $M_b$  is the molarity of the base and  $V_b$  is the volume of base.

### Procedure:

1. Put on goggles.
2. You will find the following materials at your lab station:
  - a. Erlenmeyer flask (250 mL)
  - b. Graduated cylinder (10 mL)
  - c. Beaker (100 mL)
  - d. Wash bottle
3. Use the 100 mL beaker to obtain approximately 30 mL of your soda choice. Take the soda back to your lab station.
4. Measure 10.0 mL of soda using the graduated cylinder.
5. Pour the 10.0 mL of soda into the Erlenmeyer flask.
6. Add 2 drops of phenolphthalein indicator to the flask. Swirl the flask to mix the solution.
7. Place the flask under the buret.
8. Record the initial volume of the base (buret) to 2 decimal places.
9. Add NaOH to the flask in small increments. Swirling after each addition. The longer the pink color stays, the closer the reaction is to the equivalence point (i.e. completion).
10. Titrate until pale pink color stays.
11. Record the final volume of the base (buret).
12. Dispose of the flask contents down the sink. Rinse the flask with tap water.
13. Repeat Steps 3-12 two more times.
14. Wash your beaker and graduated cylinder. Return both to your lab station.

15. Wash your lab station with a wet sponge.
16. Call Ms. Wong to inspect your lab station.
17. Thoroughly wash your hands with soap and water.

Data:

Soda Name:				
<b>Trial</b>	<b>Volume HCl (mL)</b>	<b>Initial Volume NaOH (mL)</b>	<b>Final Volume NaOH (mL)</b>	<b>Observations (color of solution)</b>
1	10.0 mL			
2	10.0 mL			
3	10.0 mL			

Calculations:

- 1) Calculate the volume of NaOH used for each trial.
  - a. Trial 1:
  
  
  
  
  
  
  
  
  
  
  - b. Trial 2:
  
  
  
  
  
  
  
  
  
  
  - c. Trial 3:
  
- 2) Calculate the average volume of NaOH used (you may omit any trials that were extremely pink).
  
  
  
  
  
  
  
  
  
  
- 3) Calculate the molarity of acid in the soda.