

Name _____
Partner _____

Period _____
Date _____

Acid Base Titration Lab

Prelab Questions

- 1) What is meant by the term “standardized NaOH”?
- 2) What is meant by the term *accurately* weigh out *approximately* 4 g of NaOH?
- 3) Write the equation for the reaction between NaOH and acetic acid.
- 4) Write the equation for the reaction between HCl and ammonia.
- 5) What do all the stoichiometries have in common in this lab?

Procedure

All of the procedures in this lab assume you have listened to the lecture called titration techniques and viewed the video of the proper techniques.

Day One: Part I Learn the Indicators

- 1) Take four clean test tubes and place them in a rack.
- 2) Add five mL of cabbage juice to each.
- 3) Place one drop of vinegar in the first, one drop of 0.5 M NaOH in the second, one drop of household ammonia in the third, and one drop of 0.5M HCl in the last.
- 4) Record the color of each. These are reference colors for the rest of the lab.

Day One: Part II Titration of Vinegar with Standardized NaOH

- 1) Clean a buret as shown in class. Fill with Standardized NaOH. Record the concentration.
- 2) Find the mass of a clean Erlenmeyer flask.
- 3) Add approximately 5 mL of vinegar and find the mass of the flask and vinegar.
- 4) Add 20 mL of cabbage juice to the vinegar and titrate to equivalence with standardized NaOH.
- 5) Perform a second and third trial. Have your partner do some of the titrations.

Day Two: Part III Titration of ammonia with Standardized HCl

- 1) Clean a buret as shown in class. Fill with Standardized HCl. Record the concentration.
- 2) Find the mass of a clean Erlenmeyer flask.
- 3) Add approximately 5 mL of ammonia and find the mass of the flask and ammonia.
- 4) Add 20 mL of cabbage juice to the ammonia and titrate to equivalence with standardized HCl.
- 5) Perform a second and third trial. Have your partner do some of the titrations.

Part I Data Table

| Solution | Color | Comment |
|----------|-------|--|
| Vinegar | | This is what the vinegar looks like before the titration begins. |
| NaOH | | This is what the vinegar looks like at the equivalence point. |
| Ammonia | | This is what the ammonia looks like before the titration begins. |
| HCl | | This is what the ammonia looks like at the equivalence point. |

Part II Data Table

| Remember to use units! | Trial 1 | Trial 2 | Trial 3 |
|---------------------------------|---------|---------|---------|
| Mass of empty flask | | | |
| Mass of flask and vinegar | | | |
| Initial buret reading | | | |
| Final buret reading | | | |
| mLs of NaOH added | | | |
| Molarity of NaOH (from bottle) | | | |
| Liters of NaOH added | | | |
| Moles of NaOH added | | | |
| Moles of acetic acid in vinegar | | | |
| Mass of acetic acid in vinegar | | | |
| Mass of vinegar | | | |
| % acetic acid in vinegar | | | |

Part III Data Table:

| Remember to use units! | Trial 1 | Trial 2 | Trial 3 |
|-------------------------------------|---------|---------|---------|
| Mass of empty flask | | | |
| Mass of flask and household cleaner | | | |
| Initial buret reading | | | |
| Final buret reading | | | |
| mLs of HCl added | | | |
| Molarity of HCl (from bottle label) | | | |
| Liters of HCl added | | | |
| Moles of HCl added | | | |
| Moles of NH ₃ in cleaner | | | |
| Mass of NH ₃ in cleaner | | | |
| Mass of household cleaner | | | |
| % Ammonia in cleaner | | | |

Post Lab Question

- 1) If you added an extra ten milliliters of the cabbage juice to the vinegar how would this affect the outcome of the lab? Provide numerical support to your answer.