

Lab: Acid-Base Titration

Objectives:

1. To titrate an acetic acid solution (vinegar) with standardized 0.50M sodium hydroxide.
 2. To use the titration results to calculate the molarity of acetic acid.
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It is important to be as EFFICIENT as possible. While one lab partner is making one solution, someone else can be preparing another one!!!

Procedure:

Making the standardized solution:

1. Make standardized solution in a 250. mL volumetric flask:
 - ✓ Rinse volumetric flask with water.
 - ✓ Weigh out the NaOH needed (from the pre-lab calculation) with a balance and a weigh boat and a scoopula. **Do NOT touch NaOH!**
 - ✓ **Record the exact amount of NaOH used so that value will be used to calculate concentration of standardized solution.**
 - ✓ Carefully transfer the NaOH pellets directly to the volumetric flask.
 - ✓ Add some water and swirl the contents of the flask to begin dissolving the solid.
 - ✓ Top the solution up to the 250 mL line
 - ✓ Insert a rubber stopper, hold it with your thumb, and invert 30 times to ensure the solution is evenly mixed.
2. Rinse the burette with water (from a beaker) and then with NaOH solution. (Leave the burette in the stand. Ensure that there is a beaker underneath the burette at all times to catch any solution that may leak.)
3. Using a funnel, carefully pour the standardized solution into the burette. **Remove the funnel after use.**
4. Note down the initial reading on the burette. (How many decimal places should you record?)
5. Ensure that the volumetric flask is always capped (with a rubber stopper) and placed in a safe location.

Preparing the unknown solution:

6. Rinse each Erlenmeyer flask with water and then with vinegar.
7. Using a pipette and suction bulb, pipette 10.00 mL of vinegar into the Erlenmeyer flask. (Multiple flasks can be prepared at the same time. Efficiency!)
8. Add 2-3 drops of phenolphthalein solution into the Erlenmeyer flask.

Begin the titration!

9. Start the titration by gradually dispensing some of the standardized NaOH solution into the flask, swirling constantly. Continue adding NaOH solution, watching the contents of the flask carefully for changes. (It might be helpful to have a white piece of paper underneath the Erlenmeyer flask so that the colour changes are easier to observe.)
10. As the equivalence point approaches, a pinkish colour is evident, which initially disappears with swirling. When this colour starts to take a little longer to disappear, add the NaOH solution drop by drop.
11. Stop the titration and take the reading on the burette when the solution remains **pale pink** for approximately 30s. The most accurate end point to the titration is where the solution remains the faintest possible pink.
12. Repeat steps 5 – 10 two more times. Out of the three readings, if two values differ widely, repeat a fourth titration (and maybe a fifth). **Readings should be within +/- 0.50 mL of each other.**
13. Rinse and clean up all materials and glassware used.
14. Give your partner(s) a high-five and share with them your hopes and dreams.