

Titration with Oxalic Acid Procedure

Experiment

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1. Obtain and wear goggles.
2. Determine the mass of a 250 mL flask to 0.01 g, then add 1.0-1.5 g of oxalic acid dihydrate, and determine the mass again.
3. Add approximately 100 mL of distilled water to the 250 mL beaker to dissolve the acid.
4. Add 2-3 drops of Phenolphthalein to the beaker.
5. Place the beaker on a magnetic stirrer and add a stirring bar. If no magnetic stirrer is available, you need to stir with a stirring rod during the titration.
6. Use a utility clamp to suspend a pH Sensor on a ring stand as shown here. Position the pH Sensor in the $\text{H}_2\text{C}_2\text{O}_4$ solution and adjust its position so it will not be struck by the stirring bar. Turn on the magnetic stirrer, and adjust it to a medium stirring rate (with no splashing of solution).
7. Obtain approximately 60 mL of ~0.1 M NaOH solution in a 250 mL beaker. Obtain a 50 mL buret and rinse the buret with a few mL of the ~0.1 M NaOH solution. Use a utility clamp to attach the buret to the ring stand as shown here. Fill the buret a little above the 0.00 mL level of the buret with ~0.1 M NaOH solution. Drain a small amount of NaOH solution into the beaker so it fills the buret tip and leaves the NaOH at the 0.00 mL level of the buret. Record the precise concentration of the NaOH solution in your data table. Dispose of the waste solution from this step as directed by your teacher. **CAUTION:** *Sodium hydroxide solution is caustic. Avoid spilling it on your skin or clothing.*
8. Connect the pH Sensor to the computer interface. Prepare the computer for data collection by opening the file "24a Acid-Base Titration" from the *Chemistry with Computers* folder. Check to see that the pH value is between 2 and 3.
9. Before adding NaOH titrant, click and monitor pH for 5-10 seconds. Once the displayed pH reading has stabilized, click . In the edit box, type "0" (for 0 mL added). Press the ENTER key or click to store the first data pair for this experiment.
10. You are now ready to begin the titration. This process goes faster if one person manipulates and reads the buret while another person operates the computer and enters volumes.
11. Add the next increment of NaOH titrant (enough to raise the pH about 0.15 units). When the pH stabilizes, again click . In the edit box, type the current buret reading, to the nearest 0.01 mL. Press ENTER or click . You have now saved the second data pair for the experiment.
12. Continue adding NaOH solution in increments that raise the pH by about 0.15 units and enter the buret reading after each increment. Proceed in this manner until the pH is 3.5.
13. When a pH value of approximately 3.5 is reached, change to a one-drop increment. Enter a new buret reading after each increment. Note: It is important that all increment volumes in this part of the titration be equal; that is, one-drop increments.
14. After a pH value of approximately 10 is reached, again add larger increments that raise the pH by about 0.15 pH units, and enter the buret level after each increment.
15. Continue adding NaOH solution until the pH value remains constant.
16. When you have finished collecting data, click . Dispose of the beaker contents as directed by your teacher.

