



Standardized Acid/Base Titration

Lab #31

Introduction - According to the Bronsted theory, acids are compounds that donate H^+ ions and bases are compounds that accept H^+ ions. Many bases are hydroxides of Group I metals, such as NaOH. During a titration, an acid and a base are reacted with one another in a reaction called a neutralization. When the H^+ ions from the acid are equal to the OH^- ions from the base, the neutralization is said to have reached its end point. We are going to perform three titrations in this lab. The first titration will serve to determine the concentration of the base. The other two titrations will determine the molar masses of two unknown acids.

Materials:

Buret	Two 250 mL beakers	Ring stand with a buret clamp
250 mL Erlenmeyer flask	Potassium Hydrogen Phthalate (KHP)	Sodium Hydroxide Solution
Unknown Acid A	Unknown Acid B	Phenolphthalein

Procedure:

Rinse the buret with water. Run some water through the stopcock (valve) of the buret. Place the buret in the clamp on the ring stand. Pour approximately 10 mL of sodium hydroxide solution into the buret. Open the valve of the buret and allow the sodium hydroxide solution to run out of the buret. Close the valve and refill the buret to the 0 mL mark. If the sodium hydroxide solution is not at the 0 mL mark, record the exact volume of the solution.

On a piece of weighing paper, mass out 1 g of KHP. Record the exact mass of the KHP. Place the KHP in the Erlenmeyer flask. Add approximately 100 mL of water to the flask and swirl the flask until all of the KHP is dissolved. Add 1-2 drops of phenolphthalein to the flask.

Place the opening of the flask under the buret and begin adding the sodium hydroxide solution slowly to the acid in the flask. You will notice that the solution will briefly turn pink and then return to a clear color. When the pink color begins to persist for a few seconds, add the sodium hydroxide solution drop by drop. When one drop causes the pink color to remain, you have reached the endpoint of the reaction. Record the volume of sodium hydroxide in the buret.

Repeat this procedure using unknown acids A and B. You do not need to refill the buret before each titration. Use the final volume of the previous titration as the beginning volume for the next titration. If you need to refill the buret, do so only before or after a titration, not in the middle of the titration.

Clean up. Rinse the buret with water, allowing some water to run through the valve of the buret.

Calculations:

Determine the moles of KHP used.

Determine the volume of NaOH solution used in the KHP titration.

Determine the molarity of the NaOH solution.

Determine the volume of NaOH solution used in the titration of Acid A.

Determine the molar mass of Acid A.

Determine the volume of NaOH solution used in the titration of Acid B.

Determine the molar mass of Acid B.