

Acid-Base Titrations

There are several assignments under this category. At least 3 good trials are required for each experiment.

Standardization of 0.10 M HCl and 0.10 M NaOH (see also reference procedure in text.)

Procedure

Make one liter of each solution. Make NaOH from solid NaOH. Make HCl by diluting the concentrated HCl. The back cover of your text has information about commercial concentrated acids and bases.

Determine the appropriate amount of standard so that your titration uses about 25 mL of titrant. (In the actual experiment, most trials should use between 20-40 mL. You may need to adjust the amount of standard after your first trial.)

Standardize the NaOH with dried, standard KHP, using a phenolphthalein indicator.

Standardize the HCl with dried sodium carbonate. Use bromocresol green or modified methyl orange as indicator.

Direct Titration

Procedure

Dry the unknown for at least one hour at 110°C.

Use the same procedure as you did for the standardization, slightly increasing the amount of KHP (or sodium carbonate). You may have to adjust after the first trial. Your experiment should use over 20 mL of titrant, but MUST use at least 10 mL for each trial.

Salad Dressing Analysis

Procedure

Titrate 20 mL of salad dressing with appropriate standard. Use phenolphthalein indicator. You may adjust the amount of salad dressing so that the appropriate amount of titrant is used. (See previous experiments.)

Antacid Analysis

Procedure

Accurately weigh an antacid tablet. Crush tablet with a mortar and pestle. Accurately weigh 0.4 – 0.5 g of tablet into a 250 mL flask. Add 50.00 mL of standardized HCl. After reaction appears finished, boil solution for 3-5 minutes to remove excess CO₂. Titrate the remaining HCl with standardized sodium hydroxide, using phenolphthalein as an indication.

Equivalent Weight

Procedure

Do not dry your unknown. Determine whether you have an acid or a base and use the appropriate titrant. Accurately weigh about 0.2 g of unknown for your first titration. Adjust mass of unknown to use 20-30 mL of titrant for subsequent trials. Use the pH electrode and generate a titration curve to determine your endpoint. Use a Gran Plot or derivative curve to get the best endpoint values.