

REGULAR LAB 09e: Acid versus Hydroxide Titration

Aim To standardize a solution of HCl with a NaOH solution

Apparatus Buret, pipet, pipet filler, conical flask, funnel, stand, weighing boat, electronic balance, 250.0 mL volumetric flask

Chemicals NaOH pellets, hydrochloric acid (approx. 0.0100 M), phenolphthalein indicator, distilled water

Method

PART A. Preparing the standard sodium hydroxide solution.

1. Calculate the exact mass of solid NaOH required to make 250.0 mL of a 0.0100 M solution.
2. Place a weighing boat on the balance and record the mass.
3. Using a spatula, add approx.. the mass of NaOH calculated in 1. Record the mass accurately. **(It does not need to be exactly the same mass as calculated in 1, but must be close AND measured accurately).**
4. Using great care transfer the entire solid to the volumetric flask.
5. Add approximately 100.0 mL of distilled water to the solid in the volumetric flask, replace the stopper and shake the flask to dissolve the solid. When the entire solid has dissolved make up to the mark taking great care when approaching the mark. Near the mark add distilled water drop by drop using a teat pipet.
6. Calculate the exact concentration of the solution you have prepared.

PART B. Performing the titration.

1. Pipette exactly 25.00 mL of the NaOH solution into a Erlenmeyer flask.
2. Add a few drops of phenolphthalein indicator.
3. Rinse the buret with HCl and with the aid of a funnel, carefully fill it with HCl. Fill the tip and note the initial reading. (Record to two decimal places, making the final decimal place either a 0 or a 5).
4. Carefully add HCl from the buret to the conical flask with swirling.
5. Add HCl drop by drop near the end point, using the white base of the stand to help observe a sharp color change.
6. Record the final buret reading.
7. Repeat as necessary until three consistent titres have been recorded.

Results

PART A

| | |
|--|--|
| Mass of weighing boat + solid in grams | |
| Mass of weighing boat in grams | |
| Mass of solid in grams | |

PART B

| | Titration | | | | | |
|-----------------------------|-----------|---|---|---|---|---|
| | Rough | 1 | 2 | 3 | 4 | 5 |
| Final buret reading in mL | | | | | | |
| Initial buret reading in mL | | | | | | |
| Titre in mL | | | | | | |

Average titre = _____ mL

Conclusion/Calculation

1. Write an equation for the reaction of aqueous NaOH with aqueous HCl.
2. Use your data to calculate an accurate concentration for the hydrochloric acid solution.

