Acid-Base Titration Lab

Purpose

Determine the molarity of a NaOH solution by titrating it with a standard HCl solution

Procedure

1) Using a graduated cylinder, pour 5.0 mL of 0.10 M HCl into the Erlenmeyer flask.
2) Add exactly 10.0 mL of distilled water to the flask.
3) Add three drops of indicator to the flask using the dropper bottle.
4) Swirl the flask to mix all ingredients.
5) Place the flask on the white index card under the buret containing the NaOH solution. Make sure the tip of the buret is just inside the Erlenmeyer flask.
6) Record the initial volume of the NaOH buret to the correct significant figures. Note the direction of the buret's markings.
7) Begin titrating by adding NaOH to the flask drop by drop, swirling gently. Continue the titration until a faint pink color (for phenolphthalein) or pale green (for bromothymol blue) color is seen for about 30 seconds with swirling. This color should be seen throughout the entire solution, not just where the NaOH is currently dropping.
8) If the solution is over-titrated, ask the teacher for further instructions.
9) Record the final volume in the NaOH buret.
10) Subtract the initial volume of the NaOH from the final volume.
11) Repeat the titration at least two more times.

Data and Observations

	Trial 1	Trial 2	Trial 3
Initial Volume NaOH			
Final Volume NaOH			
Volume Used NaOH			
Observations			

Calculations

Calculate the molarity of the NaOH solution for each trial. Show your work for **ALL** trials.

Trial 1:

Trial 2:

Trial 3:

Calculate the percent error of the NaOH solution for each trial. The expected molarity of the NaOH solution is 0.50 M NaOH. Show your work for **ALL** trials.

Trial 1:

Trial 2:

Trial 3:

<u>Questions</u>
1) How reproducible were the results of your trials? How did the final NaOH molarities compare for each trial? Were they similar? Why or why not?

2) Why were you able to pour the products down the sink for this lab? What were your two products of this reaction?

3) What is the balanced chemical equation for this titration?

4) Define these terms:

    a. Standard solution
    b. Titration
    c. Endpoint
    d. Volumetric analysis
    e. Gravimetric analysis
    f. Equivalence point
    g. Indicator

5) If 30.0 mL of 0.500 M KOH are needed to neutralize 10.0 mL of HCl of an unknown concentration, what is the molarity of the HCl?

6) How many mL of 0.100 M NaOH are needed to titrate 20.0 mL of 0.100 M H_2SO_4?

NOTE: This lab sheet is NOT your lab report. Please do not include this sheet with your final draft.