CHEMISTRY LAB REPORT

ABSTRACT

[In a few sentences, provide a summary of the activity: the purpose, results, and the conclusion.]

The experiment on acid-base titration is used to detect the equivalence point of sodium hydroxide (NaOH) and hydrochloric acid (HCl). Phenolphthalein is used to indicate the equivalence point. Initial and final readings of the volume of the quantitative results of sodium hydroxide are recorded in every trial. The moles of NaOH are determined to be 1.42 M.

PURPOSE

[State the objectives of your lab activity and explain what you are attempting to do. Include relevant research questions and hypotheses. Include any pre-lab questions that you wish to answer by the end of this activity.]

Calculate the molar concentration of the analyte, an unknown acid or base, given its volume and the volume of the standardized titrant with a known concentration.

MATERIALS

[Itemize all of the materials used in this activity.]

- Burette
- White tile (used to see the color change in the solution)
- Pipette
- pH indicator (the type depends on the reactants)
- Erlenmeyer or conical flask
- Titrant (a standard solution of known concentration - HCl or Hydrochloric Acid
- Analyte (the solution of unknown concentration) - NaOH or Sodium Hydroxide

METHODS

[Describe in detail every necessary step to perform the experiment. It must be written in the impersonal (3rd person) past tense. Indicate all safety precautions to be observed in conducting the experiment. Put properly labeled illustrations if necessary]

1. Wash the equipment using distilled water then rinse the burette with the standard solution, the conical flask with distilled water, and the pipette with the unknown solution.

2. Pour an accurately measured volume of the unknown solution into the Erlenmeyer flask using the pipette. Add a few drops of the indicator. Fill the burette with the standard solution and record its initial volume on your notebook. At this stage, you want a rough estimate of the amount of known solution necessary to neutralize the unknown solution. Slowly pour the solution from the burette into the flask until you see a slight change in color (Equivalence point or endpoint). This is the first titration and it is not considered precise. It should be excluded from any calculations.

3. Perform at least three more titrations, this time more accurately, taking into account where the endpoint will roughly occur. Record the initial and final readings on the burette, prior to starting the titration and at the endpoint, respectively.

4. The endpoint is reached when the indicator permanently changes color.

DATA AND OBSERVATION

[Record all of your gathered data directly on your lab notebook. Be sure to organize it in a neat and orderly manner. Use the correct figures and always indicate the proper units.]

Trial 1:
Initial Volume:
Final volume:

Trial 2:
Initial Volume:
Final Volume:

Trial 3:
Initial volume:
Final volume:

ANALYSIS

[Show how the calculations are carried out. Define the equations used in the calculation and explain how your values are substituted into it. Highlight the calculated values.]

[Create a graph to better represent the data you have collected. Be sure to make the graphs in the appropriate size. Put a title to identify which data it represents and label all axes properly. If the graph is generated using a computer, print it and paste it here.]

[For experiments that are not quantitative, this section may be omitted.]

1. Set the number of moles at the equivalence point equal to one another.

   M(HCl) x V(HCl) = M(NaOH) x V(NaOH)

2. Document all the known variable in the equation.

   V(NaOH) = Final Volume - Initial Volume
   M(HCl): 0.2 M
   V(HCl): 10ml

3. Algebraically solve for M(NaOH):
   Divide by V(NaOH) on each side of the equation:

$$\frac{M(HCl)\,x\,V(HCl)}{V(NaOH)} = \frac{M(NaOH)\,x\,V(NaOH)}{V(NaOH)}$$

   Therefore,

$$M(NaOH) = \frac{M(HCl)\,x\,V(HCl)}{V(NaOH)}$$

4. Substitute the values from step one and solve for the concentration of sodium hydroxide (For this calculation 1.4 ml of NaOH will be used only to provide an example)

$$M(NaOH) = \frac{(0.2M)(10ml)}{1.4\,ml}$$

$$\simeq \mathbf{1.42}\,\boldsymbol{M}$$

CONCLUSIONS

[Present your conclusions based on the results of your experiment. It should address your purpose and must be supported with data. If you wrote a hypothesis on your purpose, the conclusion should either accept or reject it.]

Based on the data gathered from the experiment, the analyte used in this experiment has a concentration of 1.42M.