Skill Builder

Chapter 8

BLM 8-3

Determining the Concentration of an Acid

Goal

To gain a better understanding on how to use titration data to calculate the concentration of an acid.

Procedure

The following data was collected from the titration of an unknown concentration of HCl with 1.0 mol/L NaOH using phenolphthalein as the indicator. Using the data, construct a graph showing pH on the *y*-axis and volume of NaOH on the *x*-axis. Use the graph to answer the questions below.

Initial Volume of HCl = 25.0 mL

Volume of NaOH (mL)	pH	Observations
0.0	0.22	clear
5.0	0.40	clear
10.0	0.57	clear
15.0	0.75	clear
20.0	1.15	clear
22.5	1.50	some pink but clears upon mixing
25.0	6.98	solution staying pink
27.5	12.72	pink
30.0	12.98	pink
35.0	13.25	pink
40.0	13.38	pink
45.0	13.47	pink
50.0	13.51	pink

Question

1. Define equivalence point.

2. Define endpoint. What indicator was used to find the endpoint of this titration?

3. Determine the volume of NaOH at the equivalence point.

4. How many moles of NaOH were used to reach the equivalence point? (Hint: Moles of NaOH = Volume of NaOH (in L) × Concentration of NaOH.)

5. Determine the initial concentration of HCl. (Hint: Concentration = # moles of NaOH ÷ initial volume of HCl (in L).)