

CHEMISTRY

Lab 9: pH titration curves

The aim of this practical is to plot and investigate the pH titration curves for the titration of a strong with a strong base and of a weak acid with a strong base.

Procedure:

Part I

1. Pour 30 ml of the HCl solution of unknown concentration in a 100 ml beaker. Add a few drops of phenolphthalein and a stirring magnet.
2. Place the beaker on the magnetic heater and activate the rotating motor but *not the heater*.
3. Insert the two probes of the calibrated pH-meter in the beaker and record the pH.
4. Position a burette over the beaker and fill it up with the NaOH solution of unknown concentration.
5. Add NaOH in progressively shorter steps until you observe a change in color. Record the pH each time.
6. Continue adding NaOH in progressively longer steps until the pH does not change considerably.

Part II

Repeat the above procedure using the ethanoic acid solution of unknown concentration

Processing

Part I

1. Plot pH versus volume of NaOH added to the acid
2. Calculate the initial concentration of HCl
3. Find from the graph the equivalence volume
4. Calculate the concentration of NaOH

Part II

5. Plot pH versus volume of NaOH added to the acid
6. Find from the graph the equivalence volume
7. Find the concentration of HCl with two ways:
 - a. from the pH axis
 - b. using the equivalence volume and
8. Compare the two concentration values
9. Find the pH at half of the equivalence point with two ways:
 - a. from the graph
 - b. using acid-base pH calculations
10. Compare the two pH values
11. For which range of volumes is the mixture a buffer solution?
12. Explain why the mixture is a buffer solution at this range
13. Compare the two graphs in terms of the shape of the curves. Find similarities and differences.