**Strong Acid, Strong Base: Titration Lab**

Purpose To illustrate the equivalence point and end point of a Brǿnsted Lowry acid base reaction

Materials HNO3(aq) (unknown concentration)

NaOH(aq) (1.0 )

Burettes

Pipettes

Volumetric flask

Beakers, stir rods,

Erlenmeyer flasks

Indicator

Prelab:

1. Calculate the mass of NaOH(s)  necessary to make 100 mL of 1.0  basic solution
2. Write the Bronsted Lowry reaction for the titration of a 10.0 mL sample of NaOH(aq) with sufficient HNO3(aq). Label the base, acid, conjugate acid and conjugate base.

* . The base used in this lab is (monobasic, dibasic, polybasic) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The acid used in this lab is (monoprotic, diprotic, polyprotic) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The expected graph of titrant / pH will start at a (high or low ) pH, will have (one, two, three) bumps, and will end at a (high or low) pH.

1. List the indicator you wish to use for this lab \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Predict the initial colour \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the equivalence point colour \_\_\_\_\_\_\_\_\_\_\_.
3. What will the expected pH be at the equivalence point? \_\_\_\_\_\_\_\_\_. Justify this choice.
4. When the acid becomes the excess reagent, what colour will the indicator become? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Procedure:

1. Using correct procedure, make 100 mL of 1.0 NaOH(aq) solution.
2. Using correct rinsing procedure, pipette 10 mL of this basic solution into a clean Erlenmeyer flask.
3. Add the indicator. Record the color
4. Rinse and fill the burette with the unknown concentration of HNO3(aq) solution provided by your instructor. Record the initial volume in the burette.
5. Slowly titrate the basic solution until the end point is reached.

* Record the color.
* Record the volume in the burette.

1. Keep this sample as a reference point .
2. Refill the burette with HNO3(aq) and repeat steps 5 & 6 until you get three concurrent values for the volume of acid added.

Observations:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Trial | Volume of base | Volume of acid | Initial colour :  Indicator is \_\_\_\_\_ | Equivalence point colour | End point colour |
| 1 | 10 mL |  |  |  |  |
| 2 | 10 mL |  |  |  |  |
| 3 | 10 mL |  |  |  |  |
| 4 | 10 mL |  |  |  |  |
| 5 | 10 mL |  |  |  |  |
| 6 | 10 mL |  |  |  |  |

Analysis:

* Use your observations to calculate the concentration of the unknown acid. Be sure to use only concurrent values in your calculations
* Calculate the initial pH for the base solution
* Sketch the general shape of the titration graph for this titration. Clearly mark the equivalence point of the graph.