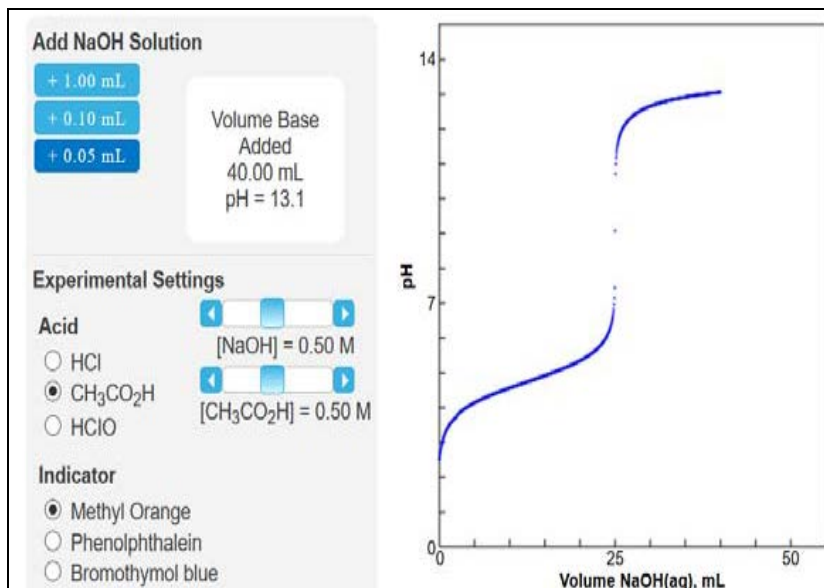


Chem 112 – Experiment 6 – Simulation – Acetic Acid – Determining its K_a Using a pH Titration Curve

Background

pH Titration Curve of CH_3COOH



To date the equivalence point of an acid base reaction has been determined using an indicator. In this experiment we are going to monitor the changes in pH that occurs during the titration of a weak acid with a strong base. At the equivalence point one should expect to see a dramatic change in pH as the solution goes from acidic to strongly basic.

Depicted on the left is what the titration of 0.5M CH_3COOH with 0.5M NaOH looks like when the NaOH is added in 0.05mL increments all the way up to 40mL of NaOH added. This would be tedious in the lab but not so using the pH Titration Curves simulation



Procedure

Your goal is to attempt to reproduce the curve depicted above using the Online Web Simulation.

1. Choose CH_3COOH as the acid and set the concentration to 0.50M.
2. Set the NaOH concentration also to 0.50M.
3. Now add the NaOH in the following increments until you have added 40mL of base. After each addition of NaOH, record the pH.
 - a) 0-20 mL of NaOH in 1mL increments.
 - b) 20-22 mL of NaOH in 0.1mL increments.
 - c) 22-26 mL of NaOH in 0.05mL increments.
 - d) 26-29 mL of NaOH in 0.1mL increments.
 - e) 29-40 mL of NaOH in 1 mL increments.

The Data Table will make this clearer.

Be grateful you are doing this via a simulation and not having to do this in lab 😊

4. Using Excel plot a graph of pH (Y-axis) versus volume of NaOH added in mL (X-axis).
5. Convert this graph to a pdf and include it in the report that you submit to your TA.

That was the easy part. Now comes some calculations most have you have already done exercises on. You could look up the K_a value for CH_3COOH but we want you to determine your own value from the online curve to and to use this value in all subsequent questions.