

Weak Acid, Strong Base Titration Lab

Chemistry 20

TEACHER notes

Purpose to illustrate the equivalence point and end point of a neutralization reaction using indicators
To plot a titration curve using indicators

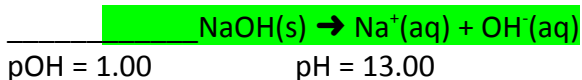
Materials Weak acid (unknown concentration) $\text{CH}_3\text{COOH}(\text{aq})$
Strong base (1.0 mol/L)
Burettes
Pipettes
Beakers, stir rods, Erlenmeyer flasks

Prelab:

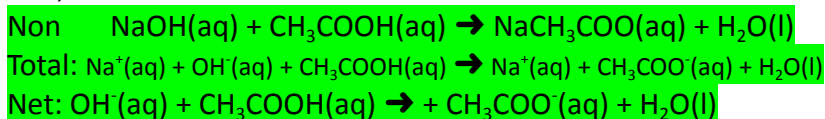
1. Use $\text{NaOH}_{(\text{s})}$. Calculate the mass of strong base necessary to make 100 mL of 1.00 mol/L hydroxide solution

$N = c \times v$ $N = 1.00 \frac{\text{mol}}{\text{L}} \times 0.100 \text{ L}$ $N = 0.100 \text{ mol}$	$m = n \times M$ $m = 0.100 \text{ mol} \times 40 \frac{\text{g}}{\text{mol}}$ $m = 4.00 \text{ g}$
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2. Write a dissociation reaction for the dissolving of $\text{NaOH}_{(\text{s})}$. Use this to find the pH of the solution



3. Write the neutralization reaction for the titration of the acid and base. Show the non, total and net ionic reactions



4. If a graph of pH and the volume of titrant is sketched, the graph will begin at a low number and will end at a high number

5. Choose an indicator for the lab _____
6. Predict the color before and after the equivalence point. _____ and _____

Part A:

1. Using correct procedure, make 100 mL of the basic solution.
2. Using correct rinsing procedure, pipette 10 mL the unknown acid into the flask
3. Add the appropriate indicator. Record the color _____
4. Rinse and fill the burette with the base.
5. Slowly titrate the acid solution until the end point is reached. Record the color.

6. Keep this sample as a reference point and repeat the steps again.
7. Do successive trials until you have three values that are concurrent.

Part B:

1. Now that you have established the volume of base that is required to reach the end point, you will use the universal indicator to gather information for a titration curve.
2. Begin with the same 10 mL of acid. Add three drops of universal indicator. Record the colour and the corresponding pH value.
3. Now slowly add the base to the acid. Stop every 2 mL and record a colour and the corresponding pH value.
4. **When you are nearing the end point volume**, stop every 0.50 mL Record colours and corresponding pH values
5. Continue with the addition of 0.50 mL until you are at least 4 mL past the end point volume.
6. Then add 2 mL amounts until you have double the end point volume.

Observations:**Part A**

Concurrent values should be within 0.10 mL

Trial	Volume of acid	Initial colour	Volume of base	End point colour
1				
2				
3				
4				
5				

Part B Universal Indicator and 10 mL of acid

Volume of Base (mL)	Color of universal indicator	pH
0		

Volume of Base (mL)	Color of universal indicator	pH

Analysis:

1. Use the information gathered in the lab to calculate the concentration of the acid.
2. Using the concentration of the acid, calculate the pH of the acid. Compare this to the pH measured using universal indicator. Account for any similarities or differences in the two values.
3. Plot the pH versus volume of base information found in part B. Be sure to correctly label the titration curve.