Science Starter

- The pOH of a solution is found to be 5.50. Determine the concentration of the hydronium ions in the solution.

- Is the solution acidic or basic?

Titrations

ARBOR PREPARATORY HIGH SCHOOL CHEMISTRY

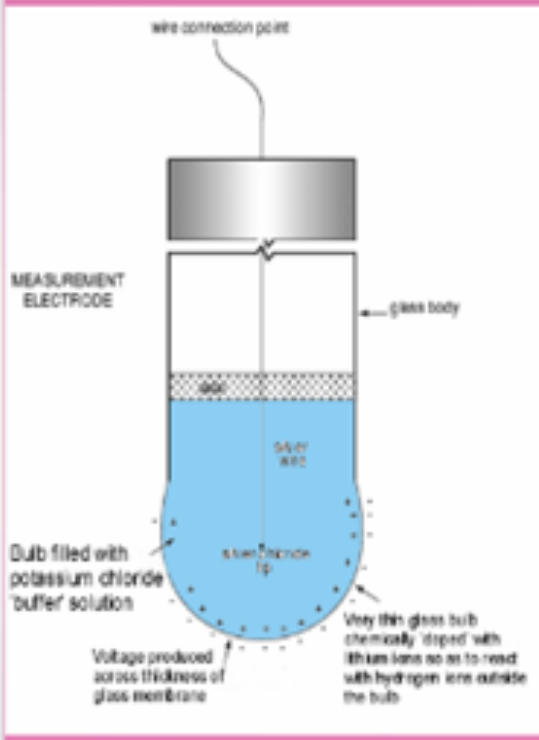
Indicators and pH

- Acids and bases can have approximate values for the pH by the use of an indicator. An acid/base indicator is one that demonstrates colors with respect to the pH.
- Color changes occur when the acid or base has accepted or donated the correct amount of protons.
- The most common indicator we use is phenolphthalein.

Measuring pH

Universal indicators are formed by mixing multiple indicators. Paper that has been soaked in universal indicator solution is called pH paper and gives an estimate of the pH.

Another way of determining the hydronium or hydroxide ion concentration is by using a pH probe. This determines the pH by calculating the voltage between two electrodes that are placed in the solution.



Titrations

- Review: Neutralization occurs between an acid and a base.
- When there is equal amounts of acid as there is base, a titration has reached it's end/equivalence point.
  - The small addition of an acid or a base into the other until the equivalence point is called a titration.
- Scientists use titrations on all levels to solve various problems.
  - The most common is to determine an unknown concentration of a substance.

Titration Calculations

1.

2.

3.

4.

Practice #1

- In a titration, 27.4mL of 0.0154 M $Ba(OH)_2$ is added to a 20.0mL of an HCl solution. Answer the following questions.
  - Write a balanced chemical equation:
  - How many moles of HCl is equivalent to the moles in the sample problem?
  - What volume of HCl was neutralized?
  - What is the concentration (M) of the HCl solution?

Practice #2

- In a titration, 15.5mL of 0.215 M potassium hydroxide is added to a 21.2 mL of an acetic acid solution. Answer the following questions.
  - Write a balanced equation:
  - How many moles of acetic acid is equivalent to the moles in the sample problem?
  - What volume of acetic acid was neutralized?
  - What is the concentration (M) of the acetic acid solution?

Practice #3

- In a titration, 17.6mL of H_2SO_4 was neutralized with 27.4mL of 0.180M LiOH. What is the concentration of the sulfuric acid?

Practice #4!

- Suppose it takes 23.2mL 0.794M H_3PO_4 to titrate 56.1mL of $Ca(OH)_2$. Determine the concentration of the calcium hydroxide.

So titrations are easy, huh? ☺

- If the student over titrated the solution with 1.67mL extra of the calcium hydroxide, what is the final solution pH? Hint: think about the total volume of the solution as well…