

Strong Titration

Strong Titrations

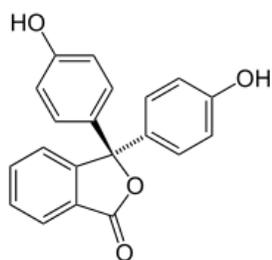
Fundamentals

- There are four major types of acid-base titrations
 - Strong - Strong
 - Weak acid - Strong base or Weak base - Strong Acid -
 - Polyprotic acid titrations
 - Weak - Weak titration
 - We aren't responsible for the last two
- In an acid-base titration, a solution with a known concentration (standard) is added in a controlled manner to another solution
 - The pH of the mixture is then tracked, either qualitatively or quantitatively
- An indicator is used to indicate the equivalence point
 - The point at which stoichiometrically equal amounts of acid and base have been added.
- Titration Curves
 - A graph representing the amount of standard added vs the pH
 - Broken into 4 regions

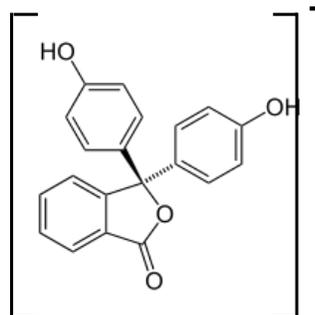
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Indicators

Phenolphthalein



COLORLESS

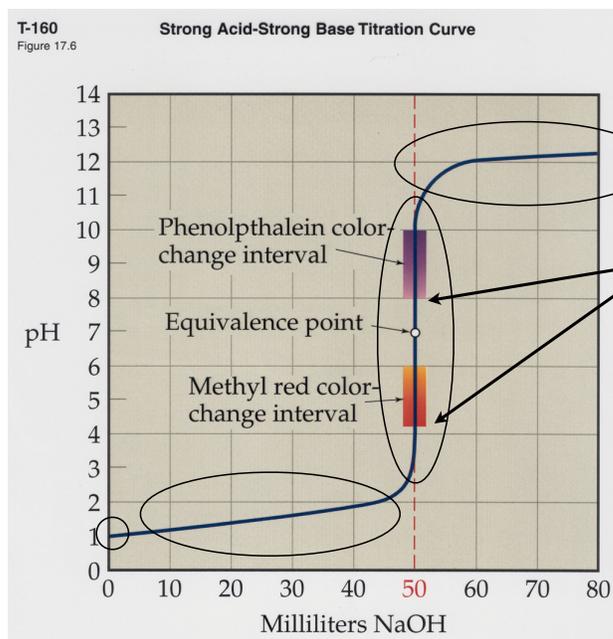


PINK



Strong Titrations

Titration Curves



Strong Titrations

Strong Acid - Strong Base Titrations

- $\text{HCl} + \text{NaOH} \rightleftharpoons \text{NaCl} + \text{H}_2\text{O}$
- Since these are strong/strong titrations, there is no equilibrium
 - Therefore, what units will our calculations be done in?
- Let's look at the 4 regions
 - Initial pH
 - The initial pH of the solution before any base is added
 - Can be found directly from the concentration of the strong acid
 - Between initial and equivalence
 - The pH rises slowly at first, then quickly as it nears equivalence
 - The pH of the solution can be found by calculating the concentration of the unreacted acid
 - Be sure to keep in mind volume changes as one solution is added to the other

Strong Titrations

Strong Acid - Strong Base Titrations

- At the equivalence point
 - Equal molar amounts of acid and base add
 - Only a salt solution remains
 - This remaining salt has no effect on pH
 - $\text{pH} = 7$
- After equivalence
 - Additional base is added
 - The pH is determined by the concentration of the excess base

Strong Titrations

Strong Acid - Strong Base Titrations

- Calculate the pH when the following quantities of 0.100 M NaOH solution have been added to 50.00mL of 0.100 M HCl solution.
- 49.00 mL
- 50.00 mL
- 50.50 mL

Strong Titrations

Homework

- 17.6 / 17.41a&c / 17.42a&c / 17.43 / 17.44