Ministry of higher Education & Scientific Research
Al-Rasheed University College/
Pharmacy Department

Practical Inorganic pharmaceutical chemistry I

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Lab 3

Preparation and Standardization of 1N Sodium Hydroxide Solution

Done by:

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Preparation and Standardization of 1N Sodium Hydroxide Solution

- Sodium hydroxide is a strong base that is usually used to prepare standard alkaline solution useful for volumetric analysis of acidic compounds.
- Sodium hydroxide is **hygroscopic** (absorb moisture) and can react with atmospheric carbon dioxide.
- Sodium hydroxide solution contains not less than 97.5% w\w of total alkali calculated as NaOH, and not more than 2.5% w\w of Na_2CO_3.
  - Sodium hydroxide is strong base absorb moisture from atmosphere:

$$2NaOH + CO_2 \rightarrow \underset{\text{(Water soluble)}}{Na_2CO_3} + H_2O$$

1- Preparation of 100 ml. of 1N NaOH:

Procedure:

- Dissolve the sample of sodium hydroxide in 100 ml.-distilled water allow cooling why? and then adding saturated barium hydroxide solution dropwise with stirring until a precipitate is formed. Leave aside allowing for complete precipitation, filter, and collect the filtrate to be standardized against 1N HCl solution.

$$2NaOH + CO_2 \rightarrow \underset{\text{(Water soluble)}}{Na_2CO_3} + H_2O$$

$$Na_2CO_3 + Ba(OH)_2 \rightarrow \underset{\text{(Water insoluble)}}{BaCO_3} + 2NaOH$$

The normality of Sodium hydroxide calculated from the following equation:

$$N = \frac{wt}{Eq.wt.} * \frac{1000}{V(ml)}$$

Wt.= Wt. (g) of Sodium hydroxide used.

Eq. wt. = Equivalent weight of Sodium hydroxide.

V= volume (ml.) of Sodium hydroxide.

2-Standardization of Sodium Hydroxide solution:

Chemical Principle

Sodium hydroxide is standardized against Hydrochloric acid as standard solution in **acid-base titration.**

$$NaOH + HCl \rightarrow NaCl + H_2O$$

➢ Procedure

1. Transfer 25 ml. of 1N HCl into a conical flask.
2. Add 2 drops of 0.5% phenolphthalein indicator (Prepared in 50% aqueous ethyl alcohol solution why?)
3. Start titration by adding sodium hydroxide solution drop wise from the burette with continuous stirring until the solution changes from colorless to pink.
4. Record the volume of sodium hydroxide solution used and calculate the normality.

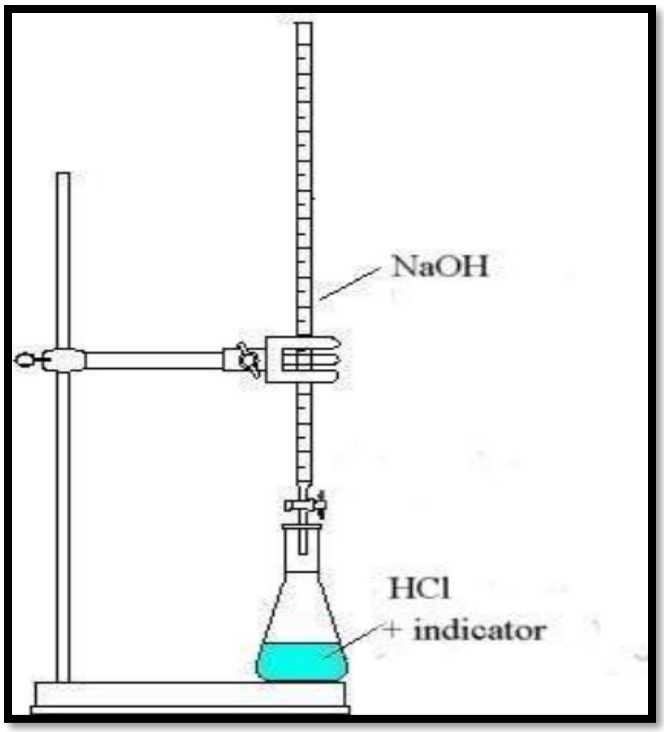

Figure (1-1) Titration equipment

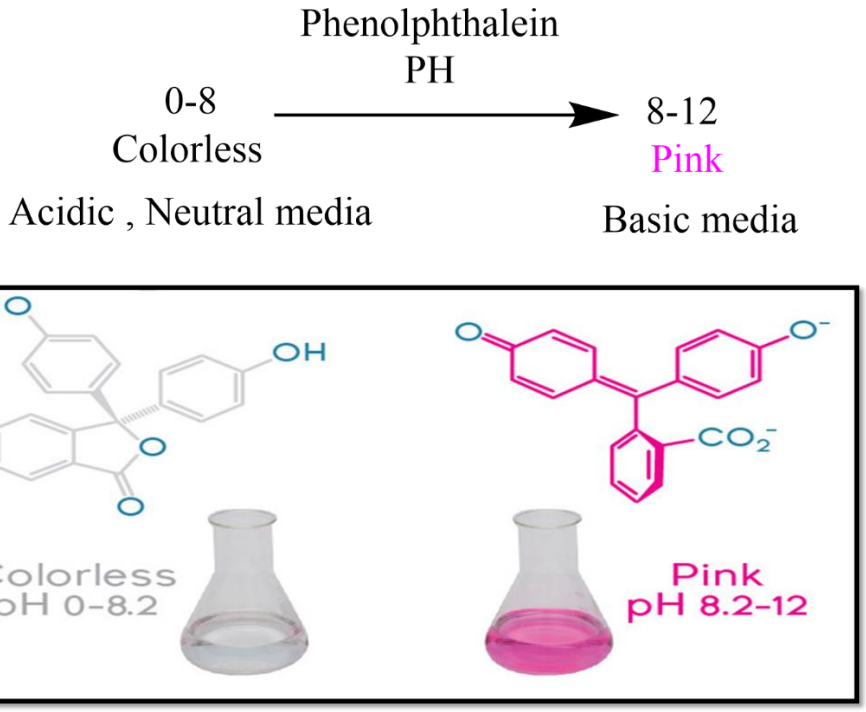

Figure (1-2) structure and PH range of phenolphthalein indicator.

Calculation

The normality of Sodium hydroxide calculated from the following equation:

$$\overbrace{N_1}^{NaOH} * V_1 = \overbrace{N_2}^{HCl} * V_2$$

N_1= The normality of NaOH to be calculated

V_1= The volume of NaOH used in ml (from experiment)

N_2= The normality of HCl used

V_2= The volume of HCl used (25ml in our experiment)