Experiment Details

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| Department Name | Basic Science % Humanities |
| Class | FY B.Tech |
| Semester | 1 st |
| Subject Name | Applied Chemistry Lab |
| Experiment No. | 01 |
| Experiment Name | Standardization of solutions |

Version History

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| --- | --- | --- | --- | --- |
| Sr. No. | Version Number | Created By | Approved By | Date |
| 1 | v1.1 | Priti Bhokare | MRS. Pooja Patil | 06/10 /2020 |
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AIM:

To prepare 0.1 molar oxalic acid solution and standardization of NaOH solution.

THEORY:

**PRINCIPLE:** Standard solutions for titrations are especially pure mixtures with exactly known concentrations. Primary standards are very pure solids. They have the advantage that they can be weighed and they are stable under laboratory conditions.

Standard solutions are solutions that contain a known and accurate amount (i.e. concentration) of a substance or element. These solutions are commonly used to help identify and determine the concentration of a substance whose concentration is unknown. When preparing standard solutions, there is need to dissolve a primary standard in a solution such as distilled or purified water.

A primary standard is a type of reagent that has specific characteristics. It aids in accurately assessing the unknown concentration of a substance. A primary standard must be pure (99% pure), very stable (i.e. not react with other chemicals), readily available and inexpensive, not change its size (i.e. solid primary standards) if exposed to air, Primary standard must be very large in size (mass) to help minimize weighing errors.

**REAGENTS:** Oxalic acid dehydrate (H2C2O4. 2H2O 3.5 g), 0.1 M NaOH, (100 ml), borax (Na2B4O7.10H2O, 4.9 g), phenolphthalein indicator.

**APPARATUS:** Burette, pipette, conical flasks, volumetric flask, white tile, beakers, glass rod, clamp and stand.

**REACTION:** 2 NaOH (aq) + H2C2O4 (aq) ⎯⎯⎯→ Na2C2O4 (aq) + 2 H2O(l)

PRE TEST:

1.The concentration of a solution is expressed as the number of moles in which of the following volumes?

* 1L
* 1ML
* 10L
* 1Dl

Ans : 1L

2. 25 mL is equivalent to how many litres (L)?

* 0.025
* 0.25
* 2.5
* 0.0025

Ans: 0.025

3. The molar mass of an element is equal to which of the following?

* Avogadro's number
* Atomic number
* Mass number
* Relative atomic mass

Ans: Relative atomic mass

# 4. When the concentration is expressed as the number of moles of a solute of a square per litre of solution is known as :

* Molarity
* Molality
* Mole Fraction
* Mass percentage

Ans: Molarity

5. Concentration of a solution can be expressed as mol lit−1.

* True
* False

Ans: True

PROCEDURE:

1. **Preparation of 0.1 M oxalic acid:**
2. Weigh out accurately about 3.15 g of oxalic acid dihydrate crystals (H2C2O4. 2H2O) on analytical balance.
3. Transfer the weighed oxalic acid dihydrate crystals into a standard volumetric flask (250 mL) and dissolve in minimum amount of distilled water.
4. Make the volume of solution up to the mark in the standard flask to obtain 0.1 M oxalic acid. Shake it by tilting the flask upside down.
5. **Standardization of NaOH solution:**
6. Fill a burette with the standard oxalic acid solution.
7. By pipette take 25.0 ml of the 0.1 M alkali solution, run it into a conical flask, add two or three drops of phenolphthalein solution.
8. Make a note of the burette reading and run in the acid from the burette until the solution becomes colorless.
9. Now repeat the titration with further portions of 25.0 ml of the alkali solution until two readings are obtained which agree to 0.10 ml.
10. Calculate the concentration of the alkali.

**OBSERVATIONS:**

1. Soln in burette: 0.1N Oxalic acid
2. Soln in conical flask: 25 ml alkali sample
3. Indicator: phenolphthalein indicator
4. End point: Pink to colourless

**OBSERVATION TABLE:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Burette  Level | Burette reading ml | | | C.B.R. ml (V1) |
| 1 | 2 | 3 |
| Final |  |  |  |  |
| Initial |  |  |  |
| Diff. |  |  |  |

**CALCULATIONS:**

N1= Normality of oxalic acid = 0.1 M

V1= Volume of oxalic acid used =…. ml

N2= Normality of NaOH solution = …..M

V2= Volume of alkali taken = 25 ml



**RESULT:**  Concentration of NaOH solution = …….. mol/lit

POST TEST:

1.In Standard solution which of the following is accurately known

* Normality, strength or % of chemicals
* Volume
* Pressure
* Temperature

Ans : Normality, strength or % of chemicals

2.The process of adding known concentration until it complete thereaction with known volume is called as

* Titrant
* Analysis
* Titration
* Titrend

Ans : Titration

3.Inration end point can be determined by change in colour?

* Measuring Cylinder
* Burette
* Instrument
* Indicator

4. Before performing the titration two pieces of apparatus are to be washed with the solution they are to contain, what are these two pieces of apparatus?

* Burette and funnel
* Pipette and conical flask
* Burette and pipette
* Conical flask and funnel

Ans : Burette and pipette

5. If 25 ml 0.1 M solution of HCl was diluted to of 500 ml , what isthe new concentration of the HCl Solution

* 0.005 M
* 200 M
* 0.05 M
* 20 M

Ans : 0.005 M

REFERENCES:

 D.C. Harris, Quantitative Chemical Analysis (7th ed., W. H. Freeman, NY, 2007) pp.