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H₂O₂ Hydrogen Peroxide

Volume

Measurement

Hydrogen

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Determination of Strength of Hydrogen Peroxide (H₂O₂)

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Determination of Strength of Hydrogen Peroxide (H₂O₂)

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Introduction

The strength of H₂O₂ is expressed in two ways-

1. Volumetric
2. Percentage (%w/v)

Volumetric: In this way, the strength is expressed as the volume of oxygen gas liberated from one unit of H₂O₂ liquor under standard condition (i.e. N.T.P.)

For example: If 1cc of H₂O₂ liberates 100cc oxygen at S.T.P. The strength of H₂O₂ will be called 100 volumes H₂O₂.



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Strength test of Hydrogen Peroxide

Percentage (%w/v): This is the weight of H₂O₂ per unit volume. This is more commonly used in our country.

Generally 35% H₂O₂ and 50% H₂O₂ used in textile sector in our country. But 50% H₂O₂ is most widely used. If 50 gm H₂O₂ is present in 100cc solution, then it will be called 50% H₂O₂.

Objectives

- To know about how determined the strength of H₂O₂.
- To know about the titration process.
- To know about the solution making.
- To know about the end point of this testing.

Apparatus

- Beaker
- Pipette
- Stirrer
- Graduate cylinder
- Electronic balance

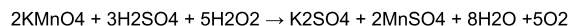
Reagents

- 0.1 N KMnO₄
- 10 % H₂SO₄
- And H₂O₂

Procedure

2.5 ml H₂O₂ is taken
 ↓
 Then it is diluted with 500 ml water
 ↓
 From that solution 25 ml is taken
 ↓
 After that it is diluted with 25 ml 10% H₂SO₄
 ↓
 Then it is taken in Conical flask. Then this sample solution is treated with 0.1 N KMnO₄

End Point: The end point is determined when the colorless solution becomes permanent pink in color.

Calculation:

Molecular equivalent weight of H₂O₂ = 17 gm

So, 1000 ml Molecular equivalent weight is 17

1ml molecular equivalent weight is = 17/1000 = 0.017 gm

In 500 ml water the amount of sample (H₂O₂) is 2.5 ml

So, 25 ml of water the amount of sample (H₂O₂) is = (2.5 x 25) / 500 = 0.125

Normality of KMnO₄ is 0.1 N



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And volume used of KMnO₄ is 21.75

$$\text{Strength of H}_2\text{O}_2 \% = \frac{(N \times V) \text{ KMnO}_4 \times \text{Molecular equivalent weight of H}_2\text{O}_2}{\text{Sample amount}} \times 100$$

$$= \frac{0.1 \times 21.75 \times 0.017}{0.125} \times 100$$

$$= 29.58$$

Results and discussion:

Required Amount of KMnO ₄	Strength of H ₂ O ₂
21.75	29.58%
22	29.92%
22.1	30.056%
21.80	29.648%
20.3	27.608%

From above results, we can say that the strength of H₂O₂ is near as 30% which was indicated at the bottle but our different persons results have been obtained near to 30% and my results is 29.58 % which is less than 30% because we have done experiment manually so something can be inaccurate measurement of pipette or burette reading. But our last person results is 27.608 % which is very less than 30 %, so I think that, his experiment more inaccurate measurement of different chemicals.

Conclusion

At last we can say that, how to determine the strength of H₂O₂, is known by this experiment. Knowledge is gained from this experiment which is very helpful in our practical life.

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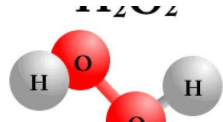
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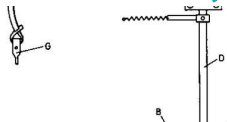
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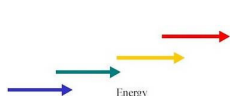
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