

Conductometric titration

Aim: To determine the molarity of the given dil. HCl acid by Conductance method using 0.1M NaOH standard solution.

Procedure:

The standard NaOH solution is taken in a well cleaned 25ml burette. The given dil. HCl solution (10ml) is transferred into a clean 100ml beaker and well mixed with 40ml of deionised water. The beaker is placed on a magnetic stirrer for a continuous smooth mixing of the solution, the conductivity cell is placed in it and the conductance measured. Now 1ml of sodium hydroxide solution from the burette is added to the beaker solution, well mixed and then the conductance measured. The experiment is repeated with further additions of burette solution up to 15ml totally. The conductance decreases up to the completion of neutralization of acid solution by the alkali solution and then increases due to further addition of NaOH solution.

Observation :-

S/No	Volume of NaOH added (ml)	Total volume of NaOH added (ml)	Specific Conductance (or) Conductivity ms/cm
1	0.0	0.0	19.88
2	1.0	1.0	17.50
3	1.0	2.0	15.26
4	1.0	3.0	13.23
5	1.0	4.0	11.50
6	1.0	5.0	9.79
7	1.0	6.0	8.38
8	1.0	7.0	6.90
9	1.0	8.0	5.67
10	1.0	9.0	4.28
11	1.0	10.0	4.06
12	1.0	11.0	4.66
13	1.0	12.0	5.24
14	1.0	13.0	5.80
15	1.0	14.0	6.32
16	1.0	15.0	6.75
17	1.0	16.0	7.01

Calculation:

Volume of HCl (V_1) = 10 ml.

Strength of HCl (M_1) = x .

Volume of NaOH Solution (V_2) = 10 ml.

Strength of NaOH Solution (M_2) = 0.1 M.

Relation:

$$\frac{M_1}{M_2} = \frac{V_1}{V_2}$$

$$\text{Strength of HCl } M_1 = \frac{V_1}{V_2} \times M_2$$

$$x = \frac{10}{10} \times 0.1$$

$$x = 0.1 \text{ M}$$

$$x = \text{strength of HCl } M_1 = 0.1 \text{ M}$$

The amount of HCl present in 1 litre of Solution =

Strength \times molecular mass

$$= 0.1 \text{ M} \times 36.45 \text{ g/L}$$

$$= 3.645 \text{ g/L}$$

Result:

The strength of the given HCl Solution = 0.1 M. The

amount of HCl present in 1 L of the given Solution

$$= 3.645 \text{ g/L}$$

Scale.

On x-axis : 1 cm = 1 unit

On y-axis : 1 cm = 1 unit

Specific Conductance

Volume of NaOH added

