

CONDUCTOMETRIC TITRATIONS - DETERMINATION OF STRENGTH OF HCl

Aim:

To determine the strength of the given solⁿ of HCl by conductometric titration with a solⁿ of NaOH.

Apparatus Required:

Conductivity meter, conductivity cell, glass rod, burette, standard flask.

Reagents Required: HCl, NaOH, Water

PRINCIPLE:-

It is based on the measurement of change of conductance with the help of conductivity meter. The conductance of solⁿ depends on the no. of ions and mobility. During acid base titration the base is added to strong acid, H^+ ions are replaced by Na^+ ions. Conductance of solⁿ decreases after neutralisation point further addⁿ of excess alkali introduces fast moving OH^- ions & conductance increases. The point of intersection of the straight line gives the end point of volume acid.

Table 1.

Standard NaOH vs Unknown HCl

Sr. No.	Vol of NaOH added	Conductance in ohm ⁻¹
1	0.0	3.6
2	1.0	3.3
3	2.0	3.0
4	3.0	2.7
5	4.0	2.6
6	5.0	2.1
7	6.0	1.82
8	7.0	1.67
9	8.0	1.41
10	9.0	1.05
11	10.0	1.02
12	11.0	1.14
13	12.0	1.30
14	13.0	1.46
15	14.0	1.63
16	15.0	1.79
17	16.0	1.94

PROCEDURE

Make up the given HCl solⁿ to 100ml in a standard flask. Pipette out 10 ml of HCl into a beaker.

Dilute the solution with distilled water so that the conductivity cell can be immersed well in the solⁿ. Note down conductance of solution. Fill the burette with standard NaOH solⁿ and run down into beaker in small increments with gentle stirring of contents of beakers.

After each addition stir contents of beaker & after an equilibrium of 2-3 minutes note corresponding conductance value and tabulate it. Continue titration till atleast 10 increments. After conductance reaches a minimum & starts increasing. After completion of titration, wash the conductivity cell with distilled water.

Plot a graph between conductivity and volume of NaOH added. The intersection of 2 lines to 1st volume axis gives the end point.

Volume of NaOH required of neutralisation is taken from the graph. In order to get accurate results, add NaOH in small increments near and beyond the end point. Calculate strength of given strong acid from given NaOH.

Table-2.

Standard NaOH u/s Unknown Its
[Fast Titration]

Sr. No.	Volume of NaOH added (ml)	Conductance in ohm
1	8.0	1.42
2	8.2	1.35
3	8.4	1.30
4	8.6	1.26
5	8.8	1.22
6	9.0	1.25
7	9.2	1.10
8	9.4	1.05
9	9.6	0.99
10	9.8	0.98
11	10.0	1.00
12	10.2	1.03
13	10.4	1.04
14	10.6	1.06
15	10.8	1.00
16	11.0	1.13
17	11.2	1.18
18	11.4	1.16
19	11.6	1.19

