

Theories of conductometric titration :**Aim : Determination of concentration & strength of supplied Strong Acid (HCl) solution by conductometric titration with Strong Base (NaOH) solution at room temperature :****Principle :**

The reaction between HCl and NaOH is - $HCl + NaOH \rightarrow NaCl + H_2O$.

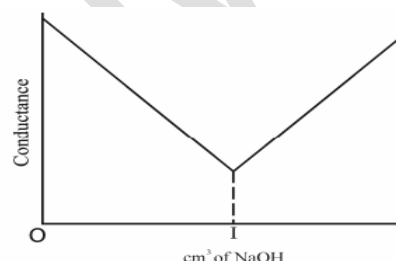
In the titration between HCl and NaOH, before NaOH is added, the conductance is high due to the presence of highly mobile hydrogen ions in solution. When the base is added, the conductance falls due to the replacement of hydrogen ions by the added cation (Na^+ ion of NaOH) as H^+ ions react with OH^- ions to form un-dissociated water. This decrease in the conductance continues till the equivalence point. At the equivalence point, the solution contains only NaCl. After the equivalence point, the conductance increases due to the large conductivity of increasing amounts of OH^- ions. The decrease and increase of conductances are linear and the point of intersection of the two lines gives the point of neutralization i.e. equivalence point.

At the neutralization point -

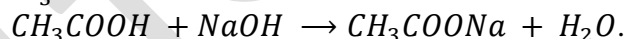
$$M_A V_A = M_B V_B$$

A - acid

B - base

**Aim : Determination of concentration of Acetic Acid (CH₃COOH) by conductometric titration with Strong Base (NaOH) at room temperature :****Principle :**

The reaction between CH_3COOH and NaOH is -



Acetic acid is a weak acid. When it is titrated with a strong base like NaOH, initially the conductance is low due to the small ionization of acetic acid. On the addition of base, there is decrease in conductance not only due to the replacement of H^+ by Na^+ but also suppresses the dissociation of acetic acid due to common ion acetate. But very soon, the conductance increases gradually on adding NaOH, as NaOH neutralizes the un-dissociated CH_3COOH to form CH_3COONa which is the strong electrolyte. This increase in conductance continues raise up to the equivalence point. The graph near the equivalence point is curved due the hydrolysis of salt CH_3COONa . Beyond the equivalence point, conductance increases more rapidly with the addition of NaOH due to the highly conducting OH^- ions. The point of intersection of the two lines gives the point of neutralization i.e. equivalence point.

At the neutralization point -

$$M_A V_A = M_B V_B$$

A - acid

B - base

