Experiment-2 : Conductometric titration

Conductance measurements are frequently used to find the end points of acid alkali and other titrations.

Principle: The electrical conductance depends upon the number and mobility of ions

Dt. 26/4/2021

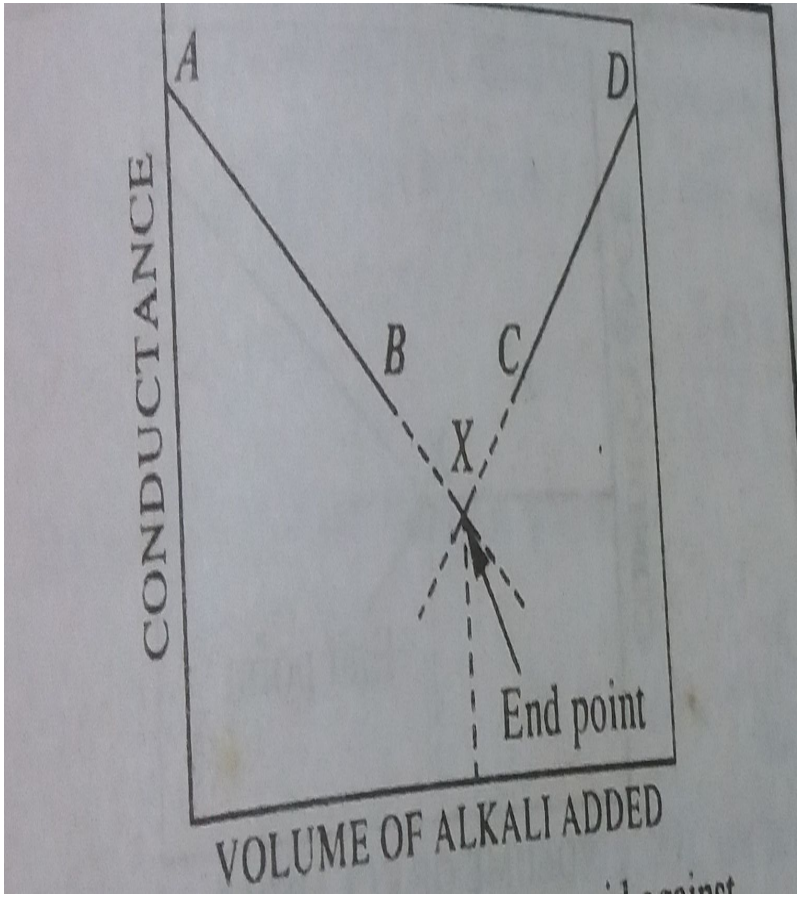
Conductometric titration

Case-1: A strong acid against a strong base

Ex: HCl vs. NaOH

$HCl + NaOH \longrightarrow Na^+ + Cl^- + H_2O$

- On addition of NaOH, the H^+ ions are replaced by slow moving Na^+ ions.
- After neutralization, addition of alkali will introduce fast moving hydroxyl ions.



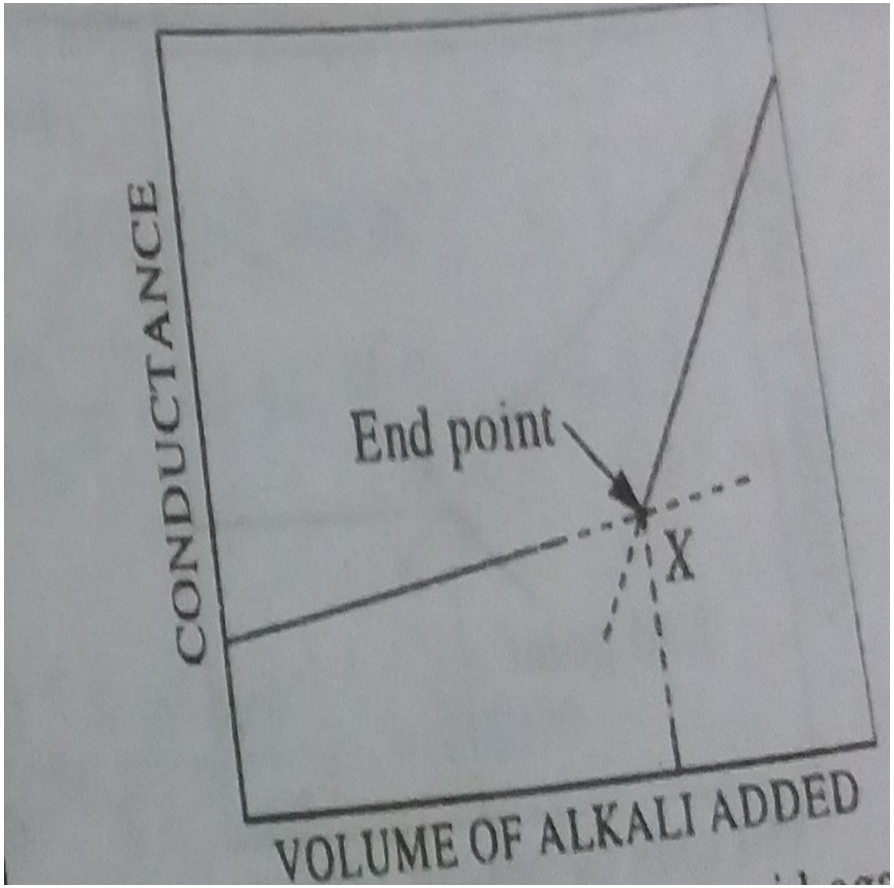
Case-2: A weak acid against a strong base

Ex: CH_3COOH vs. NaOH

$$CH_3COOH + NaOH \longrightarrow CH_3COO^- + Na^+ + H_2O$$

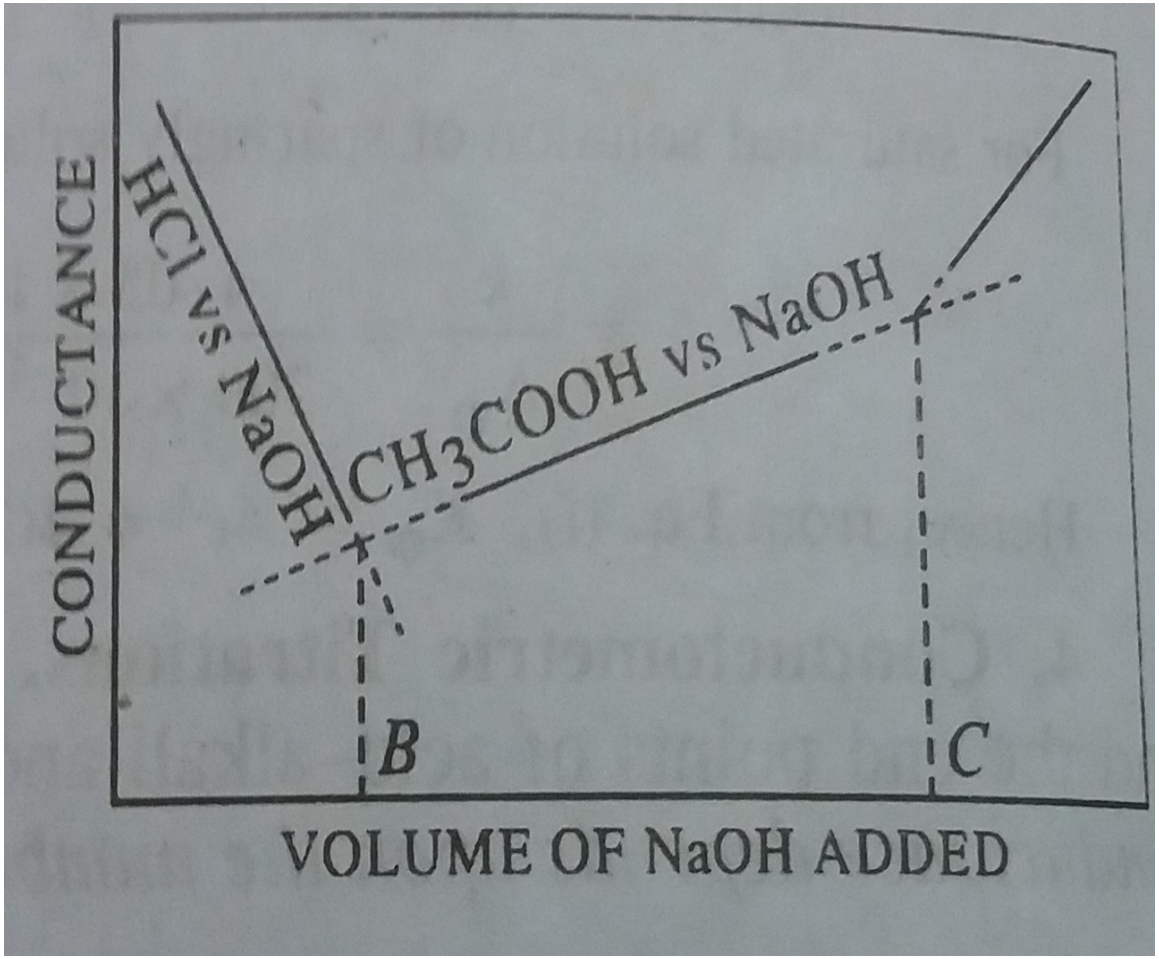
On adding the base, highly ionized Sodium acetate is formed and hence the conductance begins to increase

After neutralization, addition of the base will introduce fast moving hydroxyl ions.



Case-3: A mixture of strong and weak acid against a strong base

Ex: **Mixture of HCl and CH_3COOH vs. NaOH**

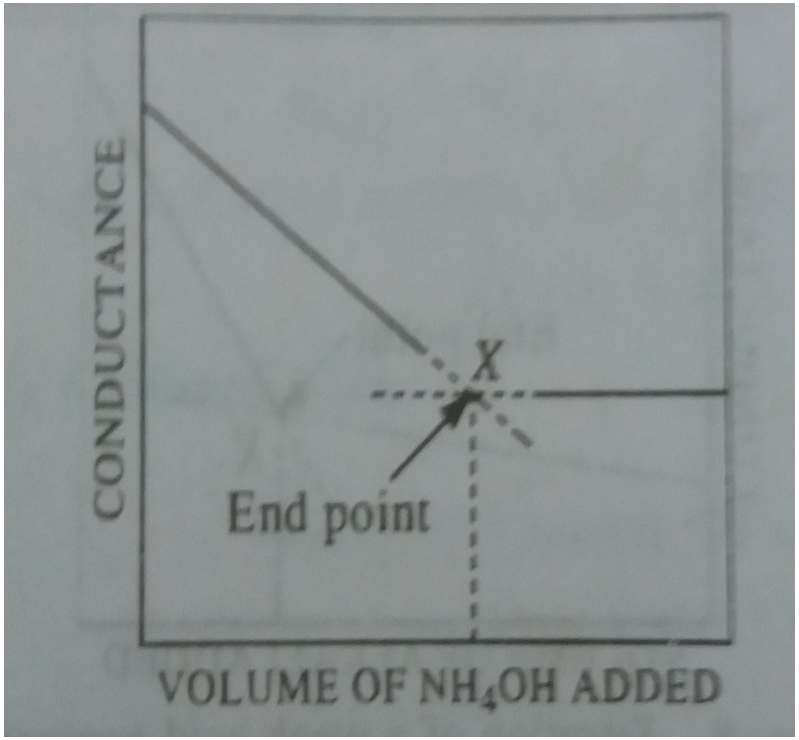


Case-4: A strong acid against a weak base

Ex: **HCl vs. NH_4OH**

$$HCl + NH_4OH \longrightarrow NH_4^+ + Cl^- + H_2O$$

- The conductance will fall first on addition of NaOH, because the fast moving H^+ ions are replaced by slow moving Na^+ ions.
- After neutralization of the acid, further addition of weakly ionized NH_4OH will not cause any appreciable change in the conductance.



Advantages

- Coloured solutions which can't be titrated by ordinary volumetric methods with the help of Indicators, can be successfully titrated conductometrically

- This method can be employed in case of very dilute solutions and also for weak acids and bases