

CONDUCTOMETRIC TITRATIONS

Measurement of conductance:

Conductivity cell:

Solution whose conductance is measured in a cell known as conductivity cell. It consists of 2 electrodes, which are firmly located in a constant geometry with respect to each other. Also known as Dipping cell in conductometric titrations.

Electrodes: It is made up of 2 parallel sheets of platinum foil. The platinum plates are coated with finely divided black platinum to reduce polarization effect.

Platinization: 2-3% solution of chloroplatinic acid & 0.02 TO 0.03g of lead acetate in the cell. Amount of solution should be enough to dip the electrode. Pass the current for 15-20 min. Electrolysis of chloroplatinic acid takes place and electrodes get blackened. Wash the electrode repeatedly with distilled water and finally with conductivity water. When not in use the electrodes are placed in conductivity water.

Conductivity water:

Conductivity water is water with high Degree of purity, with no conductance due to dissolved impurities. Ordinary water is not suitable because it contains dissolved CO_2 .

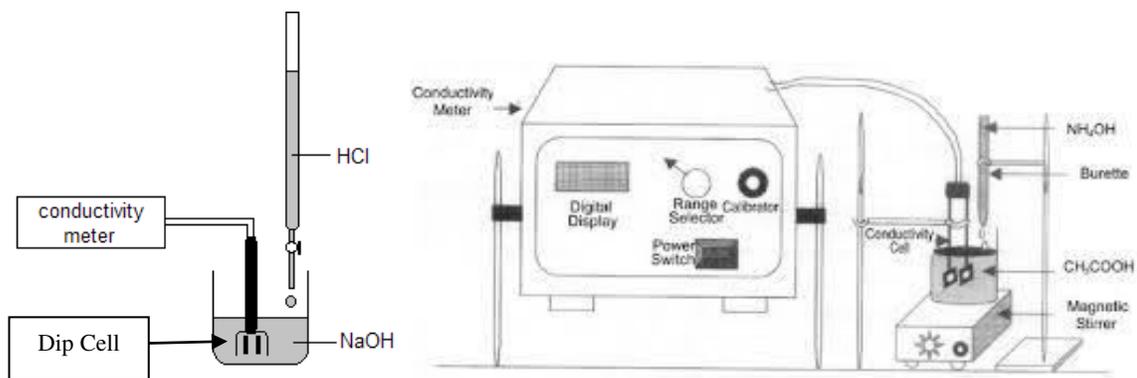
It is prepared by distilling distilled water containing small amounts of NaOH and KMnO_4 . Distillation is carried out in pyrex glass apparatus. Water is collected in a receiver fitted with a sodalime tube.

Titration Apparatus:

Conductivity bridge, detector cell (in contact with solution) or dip type cell.

Titrant is added and conductivities are measured. Plot Volume of titrant Vs Conductance

2 lines are obtained which intersect at a point, gives the end point.



Principle: In very dilute solutions, conductance is brought about by migration of ionic species i.e. anion and cations; both with varying degree of mobility towards charged electrodes. Therefore electrical current is produced and in-turn conductance.

When one electrolytic solution is mixed to another, the conductance of final solution is affected, which depends on whether the ionic reaction has taken place or not.

If no ionic reaction takes place, overall conductance of final solution is increased because all ions contribute.

Example: solution of NaNO_3 added to NaCl

If ionic reaction takes place, Conductance may be increased (due to replacement of ions of greater mobility) or decreased (due to replacement of ions of lower mobility).

Example: Solution of NaOH added to Acid HCl

Replacement of greater mobility H^+ ions with that of Na^+ ions which are less mobile.