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# **CONDUCTOMETRY - INTRODUCTION, CONDUCTIVITY CELL**

**BY, LIPSA SAMAL**

**ASST. PROF (PA & QA), SPLS, CUTM**



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## INTRODUCTION:

- It is an electrochemical method of analysis concerned with electrical conductance through an electrolyte solution . ( or) It is defined has as determination or measurement of the electrical conductance of an electrolyte solution by means of a conductometer .
- electric conductivity of an electrolyte solution depends on :
  1. Type of ions (cations, anions, singly or doubly charged
  2. Concentration of ions
  3. Temperature
  4. Mobility of ions



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## PRINCIPLE:

- Based on the conductance of electrical current through electrolyte solutions similar to metallic conductors.
- The electric conductance in accordance with ohms law which states that the strength of current( $i$ ) passing through conductor is directly proportional to potential difference & inversely to resistance.  $i = V/R$ .

### Resistance (r):

Is a measure of the conductors opposition to the flow of electric charge  $R = 1/G$

### Specific resistance:( $\rho$ )

Is resistance offered by a conductor of unit length and having unit cross section  $R \propto l/A$



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## Conductance:(G)

➤ ease with which current flows per unit area of conductor per unit potential applied & is reciprocal to resistance(R)

## Specific conductance (K):

➤ conductance of the body of uniform length(l)& uniform area cross section

## Molar conductance:

➤ Conductance of a solution containing 1 mole of the solute in 1000 cm of the solution which placed between two parallel electrodes which are 1 cm apart

## Equivalent conductance:

specific conductance of the solution containing 1gm equivalent of solute in 1000cm<sup>3</sup> of solution.



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## CONDUCTIVITY CELLS:-

- **Made of pyrex or quartz and are fitted with two platinum electrodes.**
- **Should be placed in vessel containing water to maintain constant temperature**
- **Types : 1. Wide mouthed cell 2. Cell for reactions producing precipitation**
- **Wide mouthed cell:-**
- **Measurement of low conductance**
- **Wide mouthed fitted with an ebonite cover which has provisions for platinum electrodes and burettes**



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## Cell for reactions producing ppts:

- **Mainly used for ppt reactions**
- **Also wide mouthed fitted with ebonite cover which has provisions for burette ,electrode , stirrer**
- **Stirrer may be mechanical or magnetic**



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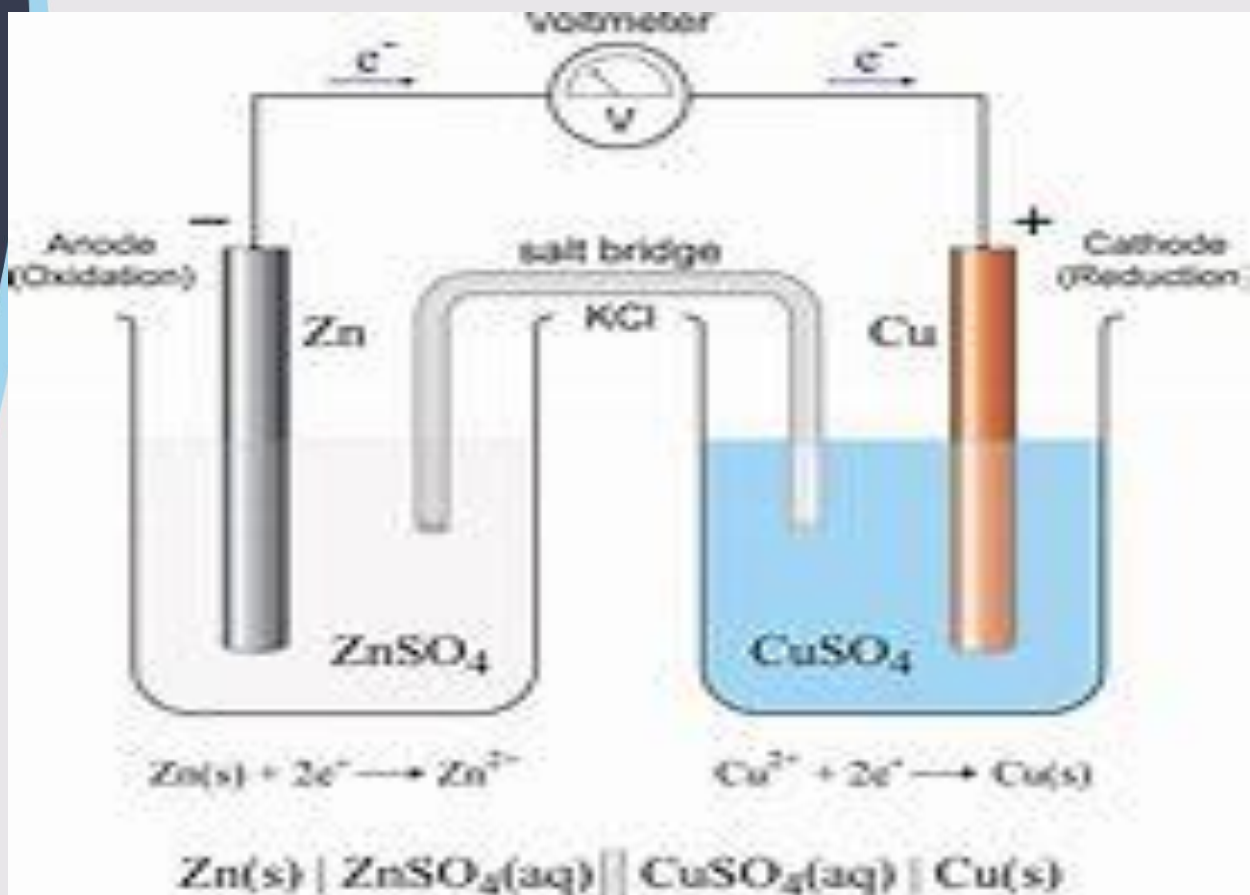
## **ELECTRODES:**

- **Platinum sheets, each of 1 cm<sup>2</sup> are fixed at distance of 1 cm**
- **The surface is coated with platinum black to avoid polarization effects and increase effective surface area.**
- **Platinisation of electrodes is done by coating solution of 3% chlorplatinic acid and lead acetate on it to get uniform coating**
- **Electrodes usage depends on conductivity and concentration**
- **If conc is low then electrodes should be largely and closely packed**



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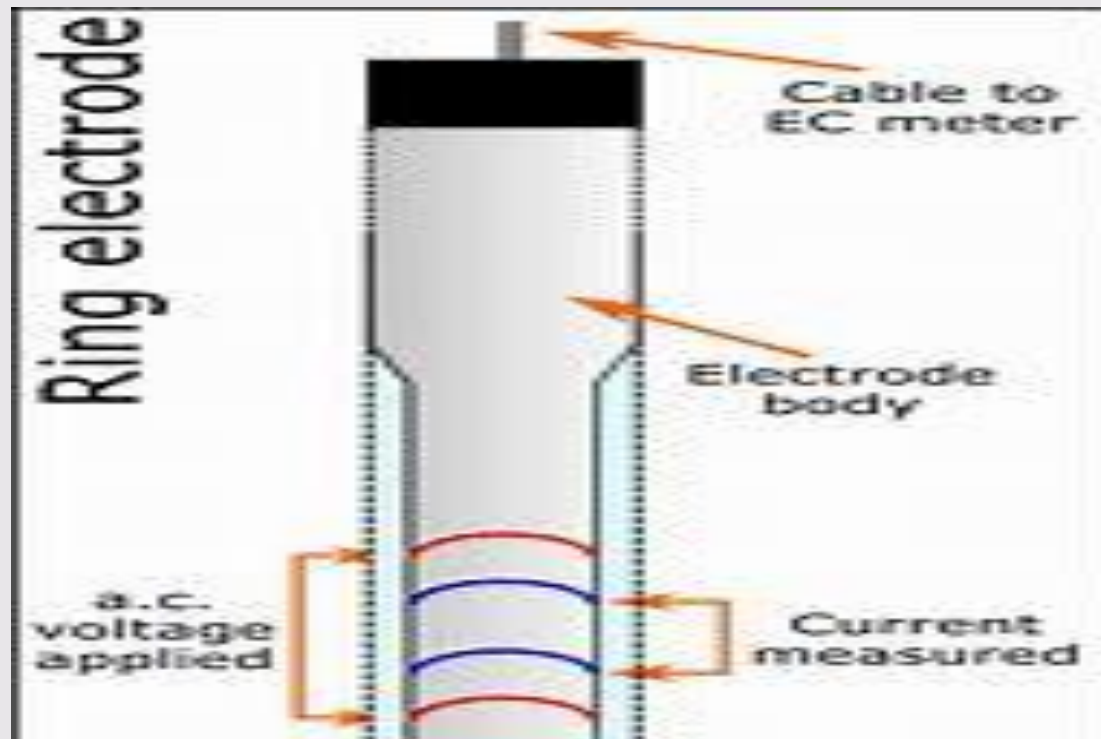
**A DIAGRAM OF A TYPICAL ELECTROCHEMICAL CELL**





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**DIAGRAM OF A TYPICAL ELECTRODE**



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**THANK YOU**