

Electrochemistry unit 3

Electrochemistry deals with the conversion of electrical energy to chemical energy and chemical energy to electrical energy. We are going to learn electrochemical cell and electrolytic cell, in both the cells Redox reaction takes place

Redox reaction means both oxidation and reduction taking place simultaneously.

Oxidation is increase in oxidation number or loss of electron.

Reduction is decrease in oxidation number or gain of electron.

There are two types of conductance metallic conductance and electrolytic conductance.

Metallic conductance

Metals conduct electricity with the help of electrons so they are called electronic or ionic conductors they do not undergo any change.

Electrolytic conductors

These are of two types electrolytic conductors and non electrolytic conductors in electrolytic conductors the dissociation of ion takes place to conduct electricity whereas in electrolytic conductors there won't be any dissociation hence they do not conduct electricity.

Electrolytic conductors are of

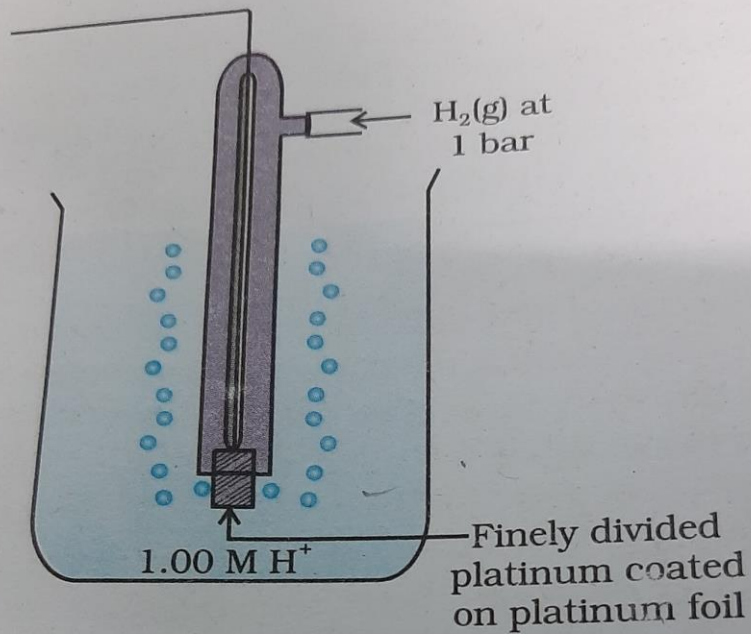
two types- strong electrolyte and weak electrolyte example of strong electrolyte are NaCl, KOH the degree of dissociation α is equal to 1 the weak electrolyte acetic acid the degree of dissociation α is less than 1.

Galvanic cell or voltaic cell

Galvanic cell or voltaic cell is an electrolytic cell. The Redox reaction takes place it is made of two half cells the anode half cell and the cathode half cell. If you have a container where two electrodes are placed both are conductors the electrode maybe inert electrode or active electrode the inert electrode like Platinum which do not involve directly in the reaction that can be any metal which can dissociate its ion. In the two half cell the anode and a cathode cell the metal electrode is inserted in the two cells they are half cells. In anode, Oxidation reaction takes place and cathode, reduction takes place the electrolytic solution used is of same type.

Measurement of electrode potential -the electrode potential is measured as the cell reaction in both the half cells the potential difference between the two electrode of a Galvanic cell is called the cell potential and is measured in volts the cell potential is the difference between the electrode potential, reduction potential of the cathode and anode it is called the cell electromotive force (EMF) of the cell when no current is drawn through the cell it is now an accepted convention that we keep the anode on the left and the cathode on the right. So in the short clip we can see that the E_{cell} is $E_{\text{cathode}} - E_{\text{anode}}$ we cannot calculate the individual half cell, in order to calculate the unknown half cell electrode potential we have to measure a standard electrode potential so now we shall see what is standard electrode potential

Potential



3.3: Standard Hydrogen Electrode (SHE).

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So here is an electrolyte of a standard electrode potential

The standard hydrogen electrode consists of a platinum electrode coated with platinum black the electrode is dipped in an acidic solution and pure hydrogen gas is bubbled through it the concentration of both the reduction and oxidised form of hydrogen is maintained at Unity that means the concentration of the solution is taken as one Molar, the pressure is 1 bar.