ELECTROCHEMISTRY

(1). Ohm's Maur = V = RI

R = p t/a

V • Potential difference

= Resistance

I ■ Current

= Specific resistance (resistivity)

= length of conductor

a = cross-section area of conductor

(2 Conductance G -

Specific conductance (conductivity) K = p

(3). Cell constant a a

• G.13

(4). Molar conductance IL IA (or 4.) = 1000 w / C {or I.A1 = concentration of electrolyte In terms of molarity}

(5). Equivalent conductance Am {or At) 1000 x K / C (or NI) {C = concentration (normality)}

AM – x(ri-fdictor)

-= lim he A. ■ equivalent conductance at infinite dilution (or zero concentration)}

(6) Far weak electrolyte, A cc NtE

Rif Strang electrofifte, A_c = A0 -8(C)[111] = constant)

{711. At infinite dilution, for an electrolyte A.By

A_KB)(A" + ye$^-$

= + = equivalent conductance at infinite 'dilution of cation and anion)

= xX^D_r J12°

)..^c_c = 1[11 ionic mobility,. K = 9165100 coulomb}

= Ionic velocity / Poientied gradient

For 2 weak electrolyte, (0‾) COOFI 41-CH_3 C00 + H^+)

Degree of association, = = G A m / 202 / " - 1 -Om /A0)

(9.11. For solubility of silk {AgCI Ag$^-$ +Cr}

K IP =(WOO K) AD

{14). For a cell reaction In an electrocihiemica I cell,

Zri CuSO Cu + Er1SO_4.

Cell representation Zn | Zn2- 0E11 II CI-12 (a4) | CI-I Amide{-} CffIhMel+)

{l a For half cell reecticin M M^{r-} Cact) ; E = E

IV'- ner hol eta = E_{rg} 00

ern/ of cell., EL, = tit quft

= hetie -E^D erode IR.P• F.1,1 = Reduction potential).

{12). $\Delta G = -nFE_{cell}$

= 2.303 RT log

$E_{cell} = E^{\circ}_{cell} - \frac{2.303\ RT}{nF} \log Q$

= Change in free energy
W Useful work clone
n = Number of electrons eiccharwgecl
F Faraday constant p8SCIO coulomb)
Q — Reaction quotient

At room temperature 25'C)

—> Nemst's equation = E_{cell} = 0.13591log Q

{13). For electrode concentration cell, Pt, H_2 (P_1) | H^+ || H_2 (P_2) Pt

$\frac{0,0591}{2} \log \frac{P}{P_2}$ (P = Pressure)

For electrolyte concentration cep (Cu | Cu^{2+} (C_1) || Cu^{2+} (C_2) | Cu)
rcde(-) arlhodefr

$E_{ce} = \frac{0.0591}{2} \log \frac{C_2}{C_1}$

For concentrationcell5, E° = 0

(14). At e-quilibriurn, = D (as ΔG = 0)

{15). Temperature coefficient = E_{cell} 1

Change in entropy, ΔS = nF x (T.C) { ΔH = hear of cell.reaction}

E_{cell} (nF).• T.CT-C)

T.0 0 Cell-reaction is endothermic and vice-versa.

(16). Faraday's 1" law of ellectrobtsis

m = Zit

m = mass of substance de posited

Z = electrochemical equivalent

= current

t = time

$$Z = \frac{\text{Atcrmic mass}}{x\ F}$$

Faraday's 2⁴ law of .elearohisis

$$\frac{m_1}{m_2} = \frac{E_1}{E_2}$$ 1E = equiweknt weight)

(17). Oxidation potential for hair-cell reaction ; M"' + ne

$$E_{ct4} = C \quad \frac{2.303}{nF} \quad 4\ [IYI+$$

Reduction potential for hair•cell reaction ; ryir ne

$$E_{red} = \quad \frac{2.303\ AT}{nF} \ IN[Mr"$$