CLASS - XII

Electrochemistry (Lecture-9)

Faraday law of electrolysis

Second law :→ When same quantity of current passed through different electrolyte solutions which are connected in series then mass of substances deposited or liberated at electrode are directly proportional to the equivalent weight of that substance.

→ Let W_1 and W_2 is mass of substance and E_1 and E_2 is their equivalent weight then

$$\boxed{\frac{W_1}{W_2} = \frac{E_1}{E_2}}$$

Now $$\frac{Z_1 \cdot It}{Z_2 \cdot It} = \frac{E_1}{E_2}$$

$$\frac{Z_1}{Z_2} = \frac{E_1}{E_2}$$

$$Z \propto E$$

$$E = FZ$$

F = Faraday constant (96500)

$$\therefore Z = \frac{E}{F} = \frac{E}{96500}$$

$$\boxed{Z = \frac{E}{96500}}$$

Application of Faraday law of electrolysis

(1) In electroplating
(2) In electrotyping
(3) In extraction of metal
(4) In purification of metal.

Ques :→ Unit of electrochemical equivalent is :—

(a) c/g (b) g/c (c) Amp/c (d) g/A

Ques :→ 9650 columb electricity passing through molten NaCl. calculate amount of sodium deposited at cathode.

Given data

$Q = 9650\ C$

$W = ?$

$NaCl \longrightarrow Na^+ + Cl^-$

$E_{Na^+} = \frac{23}{1} = 23$

$W = Z \cdot Q$

$W = \frac{E}{96500} \times Q$

$= \frac{23}{96500} \times 9650$

$= \frac{23}{10}$

$= 2.3\ g$