20/64 $2Fe^{+3} + H_{2(g)} \rightarrow 2Fe^{+2} + 2H^+$

(9) E° $e^- + Fe^{+3} \Rightarrow Fe^{+2}$ $+0.771v$ &

$H_2 \rightarrow 2H^+$

$E^\circ = +0.771v$

(10) $E = E^\circ - \frac{RT}{nF} \ln \frac{[Fe^{+2}]^2 [H^+]^2}{[Fe^{+3}]^2 [H_2]}$

$pH = -\log[H^+]$
$-5 = \log H^+$
$H^+ = 1 \times 10^{-5}$

$E = 0.771 - \frac{(8.314)(298)}{(2)(96500)} \ln \left[\frac{(1\times10^{-3})^2 (1\times10^{-5})^2}{(0.001)^2 (0.85)} \right]$

$E = 0.771 - -0.494$

$E = 1.265v$

Mar 29-7:25 AM

(8) $Sn^{+2} + Pb_{(s)} \rightarrow Sn_{(s)} + Pb^{+2}$

1M ? M

$E = +0.22v$

$Sn^{+2} \rightarrow Sn^\circ$ -0.136
$Pb^\circ \rightarrow Pb^{+2}$ $+0.126$

$E^\circ = -0.01v$

$E = E^\circ - \frac{RT}{nF} \ln \frac{[Pb^{+2}]}{[Sn^{+2}]}$

$0.22 = -0.01 - \frac{(8.314)(298)}{2(96500)} \ln \frac{[Pb^{+2}]}{1}$

$+0.01 \quad +0.01$

$0.23 = -\frac{(8.314)(298)}{2(96500)} \ln [Pb^{+2}]$

$-17.91023460 = \ln [Pb^{+2}]$

$[Pb^{+2}] = 1.66 \times 10^{-8} M$

$PbSO_4 \rightarrow Pb^{+2} + SO_4^{-2}$
$x \quad y \quad y$

$K_{sp} = [Pb^{+2}][SO_4^{-2}]$
1

Mar 29-7:51 AM

$E = E^\circ - \frac{RT}{nF} \ln Q$

Non std

NOT AT EQ

AT EQ ⇒ BATTERY DEAD! need CPR

$E = Q$ Volts , $Q = K$

$0 = E^\circ - \frac{RT}{nF} \ln K$

$E^\circ = \frac{RT}{nF} \ln K$ AT EQ.

Mar 29-8:01 AM

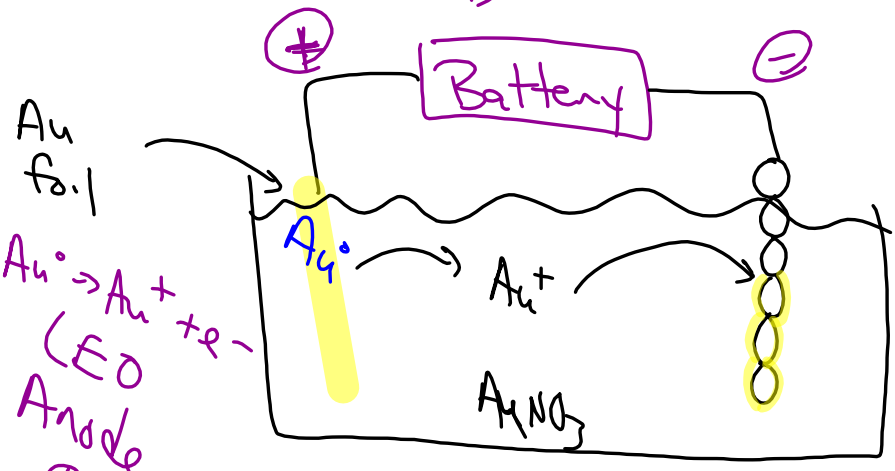
Electrolytic cell , electroplating

Non-Spont!

MUST ADD ENERGY!

(Attach a Battery)

Electrochemical SPONT Chem rxn → e⁻



$Au^+ + e^- \rightarrow Au^\circ$

GER

FAT RED CAT

(Cathode

⊖

Mar 29-8:09 AM

Electrolysis

Weld Battery

Force of Battery = Amperage

Amp

$Amp = \frac{coulomb}{sec}$ → basic Charge.

$\frac{1\ Volt}{1} = \frac{1\ Joul}{Coul}$

$1\ Faraday\ F = \frac{96500\ coul}{1\ mole\ e^-}$

$\frac{F}{mole}$

$PT = Mass / Mol_e$

Mar 29-8:22 AM

Calc #g Al in 1 hour by electrolysis. (3600 sec) of molten $AlCl_3$, 10 amp. ($\frac{10\ coul}{sec}$)

$Al^\circ \longleftrightarrow Al^{+3}Cl_3$

$Al^\circ \rightarrow Al^{+3} + 3e^-$ ⇒ $\frac{1\ mole\ Al}{3\ mole\ e^-}$

$F = \frac{96500\ coul}{1\ Mole\ e^-}$

$PT = \frac{1\ mole\ Al}{27\ g\ Al}$

$$\frac{27\ g\ Al}{1\ Mole\ Al} \left| \frac{1\ Mole\ Al}{3\ Mole\ e^-} \right| \frac{1\ Mole\ e^-}{96500\ coul} \left| \frac{10\ coul}{sec} \right| \frac{3600\ sec}{} =$$

Mar 29-8:27 AM

(?) ___ sec, 50g Mg° from $Mg^{+2}Cl_2$ 100 Amps

$\frac{100\ coul}{sec}$, $\frac{96500\ coul}{1\ mole\ e^-}$, $\frac{1\ mole\ Mg}{24\ g\ Mg}$, $50\ g\ Mg$, $\frac{1\ mole\ Mg}{2\ mole\ e^-}$

$$\frac{1\ sec}{100\ coul} \left| \frac{96500\ coul}{1\ mole\ e^-} \right| \frac{2\ mole\ e^-}{1\ mole\ Mg} \left| \frac{1\ mole\ Mg}{24\ g\ Mg} \right| 50\ g\ Mg =$$

Mar 29-8:34 AM

Zn H cell. Find pH

$(Zn^{+2}) = 1M$ $P_{H_2} = 1 atm$ $E = 0.45V$

$2H^+ + 2e^- \rightarrow H_2$?V

$Zn \rightarrow Zn^{+2} + 2e^-$ $+0.763V$

$2H^+ + Zn_{(s)} \rightarrow H_{2(g)} + Zn^{+2}$ $E^\circ = +0.763V$

$$E = E^\circ - \frac{RT}{nF} \ln \frac{[H_2][Zn^{+2}]}{[H^+]^2}$$

$$0.45 = 0.763 - \frac{(8.314)(298)}{2(96500)} \ln \frac{(1)(1)}{[H^+]^2}$$

$pH = 5.22$

Mar 29-8:39 AM

PS 20

#1-24

15 (f)

Mar 29-8:47 AM