$$E_{cell} = E^\circ - \frac{0.0592\,V}{n} \log \frac{[Zn^{2+}]}{[Cu^{2+}]}$$

$$= 1.104V - \frac{0.0592\,V}{2} \log \frac{1.35M}{0.65M}$$

$$= 1.104V - (0.0296V)(0.314)$$

$$= 1.095V$$

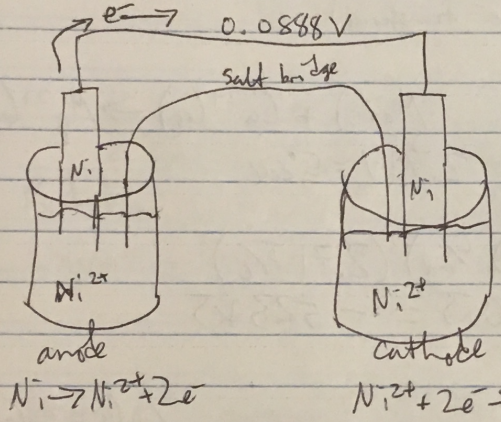
Discharging a Cell

$$E = E^\circ - \frac{0.0592}{n} \log Q$$

- As the rxn proceeds, Q ↑ and E ↓
- When E = 0, $\Delta G = 0$ and the rxn @ equilib.
- Cell is discharged

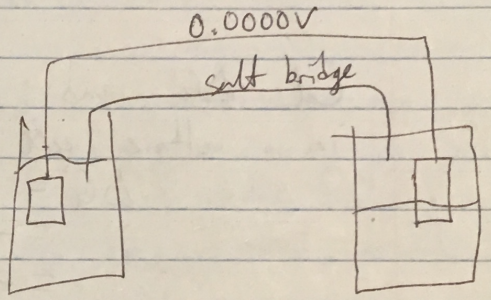
Concentration Cell

$$E = E^\circ - \frac{0.0592}{n} \log Q \qquad Q = \frac{[Ni^{2+}, dil]}{[Ni^{2+}, conc]}$$



$Ni \rightarrow Ni^{2+} + 2e^-$ $\qquad Ni^{2+} + 2e^- \rightarrow Ni(s)$

discharge ⇒



anode $\quad Ni \longrightarrow \underset{(dil)}{Ni^{2+}} + 2e^-$

cathode $\quad \underset{(conc)}{Ni^{2+}} + 2e^- \rightarrow Ni(s)$

$$Ni(s) + \underset{(conc)}{Ni^{2+}} \rightarrow \underset{(dil)}{Ni^{2+}} + Ni(s)$$

$$Q = \frac{Ni^{2+}(dil)}{Ni^{2+}(conc)} < 1$$

$$E_{cell} = E^\circ - \frac{0.0592\,V}{n} \log Q$$

$$= 0$$

if $Q < 1 \Rightarrow E_{cell} > 0$

- Both anode and cathode have same reactants
- If concentrations of the reactants in the two cells are different, Q will not equal 1 and E will not equal 0

cell w/ ↓ [ ] is anode