

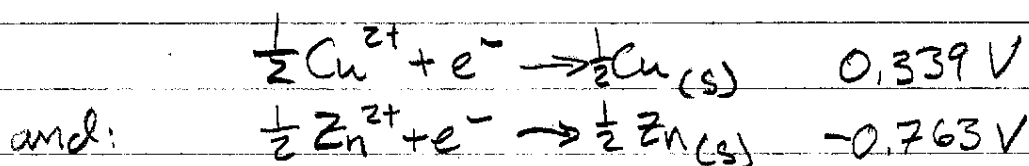
10.4

Can we make a battery from a concentration gradient?
Our results from the K^+ cell say "yes we can!"

These batteries are called concentration cells

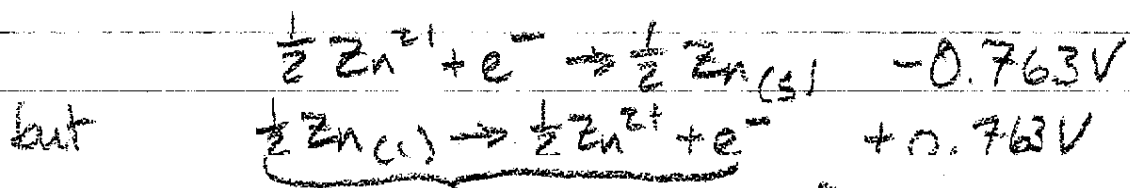
According to Nernst: $V_{cell} = V_0 - \frac{RT}{nF} \ln \frac{a_{K^+}^B}{a_{K^+}^A}$, which was what we had before ($n=1$)
since $E_{K^+}^0 - E_{K^+}^0 = 0$

In the previous example with Cu + Zn we used the standard electrode potentials:



These standard potentials allow us to calculate the EMF if the activities of all the components are equal to 1, if not we use Nernst.

In the book $V_0 = \Phi_E^{0\beta} + \Phi_E^{0\alpha}$ but $\Phi_E^{0\alpha}$ in this case has the opposite sign as the table of standard electrode potentials:



this is the book's $\Phi_E^{0\alpha}$

We also use $V_0 = \frac{-\Delta G_{rxn}^0}{nF}$ to get ΔG_{rxn}^0