Cell Potential and $\triangle$G

Because the cell potential is related to the work and charge transferred we can relate the cell potential to the free energy of the system.

$$\mathscr{E} = \frac{-w}{q} \qquad q = nF \qquad F = 96,485\frac{\text{C}}{\text{mole}^-}$$

$$\Delta G = -q\mathscr{E} = -nF\mathscr{E}$$

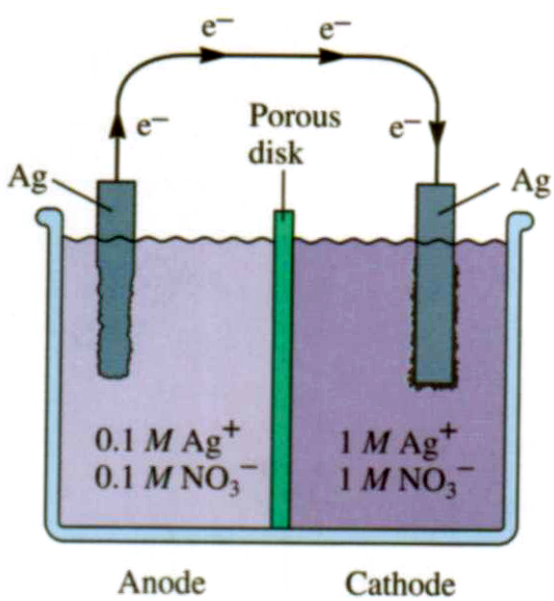
$$\Delta G^\circ = -nF\mathscr{E}^\circ$$

Concentration and Cell Potential

Just as ΔG is depends on the concentration so the cell potential depends on concentration. The equation that defines this relationship is called the Nernst equation.

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

Because the cell potential depends on the concentration we can now look at a concentration cell.



Electrolysis

Electrolysis is the process of using electricity to drive a chemical reaction. We need to be able to calculate how many electrons have been used to determine how much reaction has taken place. The most common way to do that is to measure the current(I) that is flowing through the power source. Once we have the coulombs of charge we can use Faraday's constant to determine the moles of electrons transferred.

$$I = \frac{q}{t}$$