CHEM 14B Instructor: Dr. Laurence Lavelle
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Electrochemistry and its Applications

7th Edition: Focus 6K-6O.1
Problems 6K: 1, 3, 5; 6L: 1,3, 5, 7, 9; 6M: 3, 5, 7, 11, 13; 6N: 1, 3, 5, 7, 9, 13, 17, 21, 23; 6O: 3; and 6.43, 6.45, 6.47, 6.51, 6.53, 6.57, 6.61, 6.73

After going through the readings & problems and attending the lectures & discussion groups, you should be able to:

- Describe a galvanic/voltaic cell and how it works.
- Know the definition of the electromotive force (emf, $\mathcal{E}$) and why it represents the maximum potential difference.
- Know how to balance redox reactions.
- Identify the anode, cathode, and the direction of current flow.
- Write the balanced chemical equation for a redox reaction, given a description of the cell.
- Calculate a standard cell potential, given the half-reactions for the cell and their standard potentials.
- Know how to write and interpret cell diagrams.
- Understand what is meant by the electrochemical series.
- Predict the spontaneous direction of a redox reaction using standard reduction potentials.
- Explain the relationship between work and cell potential ($w_{MAX} = -nFE$).
- Explain the relationship between free energy and cell potential ($\Delta G = -nFE$).
- Predict if a metal will dissolve in a solution.
- Predict the effect of changes in concentration of reactants and products on the cell potential.
- Know how to derive the Nernst equation ($E = E^\circ - \frac{RT}{nF} \ln Q$) and use it to calculate the cell potential as a function of concentration.
- Understand how a concentration cell works and give an example.
- Explain the relationship between standard cell potential and equilibrium constant of a reaction.
- Calculate the equilibrium constant for a reaction from the standard cell potential.
- Use and apply the above concepts and equations in industrial (e.g., batteries, rust, pH electrodes) and biological (e.g., cell potential in neurons and nerves) examples.