AP Chemistry

Syllabus: Chapters Twenty

Dr. Wilhelm

**Principles of Chemical Reactivity:**

**Electron Transfer Reactions (electrochemistry)**

**Objectives**  *the student will be able to*:

* Review writing and balancing redox reactions including half reactions in acidic and basic solutions.
* Understand the properties of simple voltaic cells.
* Apply standard electron potentials to electrochemical systems.
* Assess electrochemical cells that are under non-standard conditions.
* Be able to apply thermodynamic to electrochemistry.
* Apply quantitative measurement (electron counting) to an electrochemical equation.

**Reading**: Chapters 20

Supporting materials

**Problem Sets**: (Pg. 937 -940)

# 3(a,b), 5(a,b), 7, 9, 13, 17, 21, 25, 31, 41, 43, 45, 51

**Laboratory Activities:** Exploring Electrochemistry

Electroplating

AP Chemistry

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**Chapter Twenty Reading Guide: Electron Transfer Reactions (Electrochemistry)**

*On a separate piece of paper, write a response to the following reading prompts while reviewing chapter twenty of your textbook.*

1. Define the term electrochemistry and explain the relationship between chemical process and electrical current as it applies to this topic.
2. What is a voltaic or galvanic cell? How does this process incorporate redox reactions?
3. Section 20.1 reviews the concepts of an oxidation reduction reaction. Summarize the four bulleted items that review the concepts and strategies for identifying and writing redox reaction..
4. Review the process for balancing redox reactions including reactions in acidic and basic conditions. Complete the “Review & Check” problems for section 20.1. It is assumed that you know how to balance even complicated redox reactions.
5. Describe the voltaic cell and the essential components that allow this process to work continuously. Include a description of the salt bridge, anode and cathode in your discussion.
6. Sketch a drawing of a simple voltaic cell and include the components described above.
7. What is an inert electrode and when is it used in preparing a voltaic cell? Why is graphite and platinum useful materials to use for this purpose?
8. What is electron cell notation? Give an example of how this is used to describe a voltaic cell.
9. Review the section on commercial voltaic cells. Distinguish between primary batteries and secondary batteries. Review the basic chemistry for these types of batteries.
10. What is meant by the term electromotive force (emf)?
11. Explain how standard potential (E◦) is defined (what are the conditions for the cell being studied).
12. How do EMF and Cell potential (Ecell) differ?
13. Identify the steps for determining the standard reduction potential using the established data for common half reactions.
14. Review six points summarized regarding the table of standard reduction potentials. For example, what is meant by the northwest-southeast rule? Review this table of standard reduction potentials (a similar table is found in your AP equation sheet!).
15. Identify the Nerst Equation. How does this describe the relationship between cell potential and concentration?
16. Review section 20.8 regarding the relationship of current (amperes) and mole quantities. Identify useful equations for these relationships and review example problem 20.11.