Worksheet 14: Redox

Objectives

1. For a given redox reaction, draw a galvanic cell and identify the cathode and anode
2. Describe an experiment that will determine the relative strength of a series of oxidizing agents

Key Questions

1. Below are some helpful mnemonics for electrochemistry.
   (a) RED CAT - REDuction at the CAThode
   (b) OIL RIG - Oxidation Is Loss Reduction Is Gain (of electrons), this is an alternative to the one about the lion
   (c) If you get confused about reducing or oxidizing *agents*, you can think about travel agents: rather than traveling themselves, they facilitate the travel of other people.
2. The questions below refer to the the redox reaction $\mathrm{Br_2(aq) + Hg(s) \rightleftharpoons 2\,Br^-(aq) + Hg^{2+}(aq)}$. Assume that the equilibrium constant for this reaction is greater than 1.
   (a) Write the equilibrium constant expression for this reaction.
   (b) Write the half-reactions for this reaction.
   (c) Identify the reduction and oxidation half-reactions above, and also identify the oxidizing and reducing agents in the original reaction.
   (d) Sketch a galvanic cell that uses this reaction and label the anode and cathode.
   (e) Repeat parts a-d assuming the equilibrium constant is less than 1.
3. Balance the redox reaction $\mathrm{MnO_4^-(aq) + C_2O_4^{2-}(aq) \longrightarrow Mn^{2+}(aq) + CO_2(aq)}$.