

Worksheet 15: 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 redox reaction $\text{Br}_2(\text{aq}) + \text{Hg}(\text{s}) \rightleftharpoons 2\text{Br}^-(\text{aq}) + \text{Hg}^{2+}(\text{aq})$. 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 $\text{MnO}_4^-(\text{aq}) + \text{C}_2\text{O}_4^{2-}(\text{aq}) \longrightarrow \text{Mn}^{2+}(\text{aq}) + \text{CO}_2(\text{aq})$.