Worksheet 9

1. For a galvanic cell composed of a nickel electrode and a copper electrode:
   (a) Draw a picture of a galvanic cell composed of a nickel electrode and a copper electrode

   (b) Write the overall reaction for the whole system.

   (c) Write the half reactions for each cell as reductions.

   (d) Which one should be written as an oxidation?
   (e) Calculate the standard cell potential.

2. Describe how you will pick an anode and cathode for a given cell with only a table of reduction potentials.

3. Electrons flow (from/to) the anode and (from/to) the cathode.

4. The anode (loses/gains) mass while the cathode (loses/gains) mass.

5. Which way will anions from the salt bridge flow?
   (a) From anode to cathode
   (b) From cathode to anode

6. Write the Nernst equation.

7. A voltaic cell is constructed with two $Zn^{2+}-Zn$ electrodes. The two compartments have $[Zn^{2+}] = 1.3$ M and $[Zn^{2+}] = 1.60 \times 10^{-2}$ M.
   (a) Which electrode is the anode of the cell?
      i. 1.3 M
      ii. 1.60×10^{-2} M
   (b) What is the standard emf of the cell? (emf $= E_{cell}$)

(c) What is the cell emf for the concentrations given?

8. A voltaic cell is constructed using the following reaction at 298K:
$\mathrm{Zn(s) + Ni^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Ni(s)}$.

   (a) What is the emf of the cell under standard conditions?

   (b) What is the emf of the cell when $[\mathrm{Ni^{2+}}] = 3.60\mathrm{M}$ and $[\mathrm{Zn^{2+}}] = 0.110\mathrm{M}$?

   (c) What is the emf of the cell when $[\mathrm{Ni^{2+}}] = 0.220\mathrm{M}$ and $[\mathrm{Zn^{2+}}] = 0.990\mathrm{M}$?