

# Chemistry BC2001x: General Chemistry I



Lecture 19: Thursday November 19, 2009  
Topic: Electrochemistry: Cells and Cell Voltage

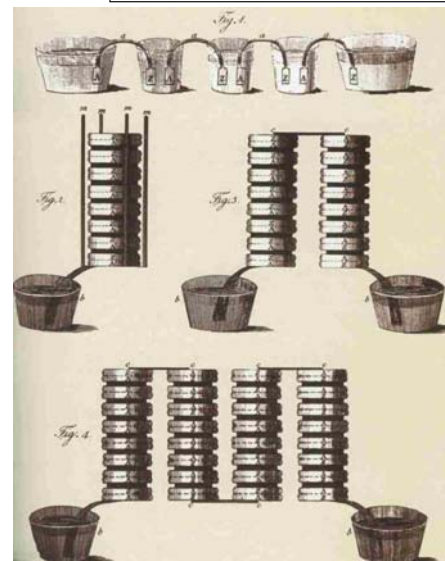
Hand in Problem Set 9

Pick up:

- Problem Set 10 plus data sheet for use with this set.
- Standard reduction potentials, Cells (2 pages)

1

# The first battery: Volta 1799

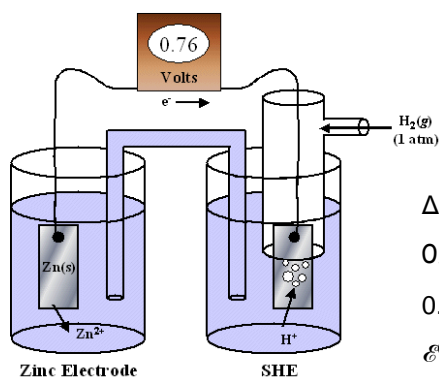


A = silver  
Z = zinc



2

# Standard Hydrogen Electrode (SHE)



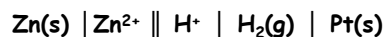
$$\Delta \mathcal{E}^{\circ}_{\text{cell}} = \mathcal{E}^{\circ}_{\text{R}} - \mathcal{E}^{\circ}_{\text{L}}$$

$$0.76 \text{ V} = \mathcal{E}^{\circ}_{\text{SHE}} - \mathcal{E}^{\circ}_{\text{Zn}|\text{Zn}^{2+}}$$

$$0.76 \text{ V} = 0.00 - \mathcal{E}^{\circ}_{\text{Zn}|\text{Zn}^{2+}}$$

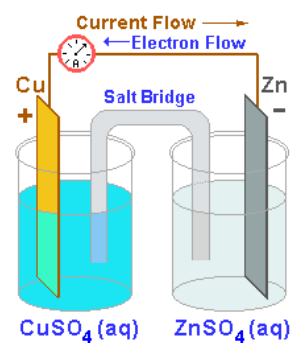
$$\mathcal{E}^{\circ}_{\text{Zn}|\text{Zn}^{2+}} = -0.76 \text{ V}$$

Cell diagram:



3

# Daniell Cell



Daniell and Faraday  
(a very early photograph  
1840's --- long exposure,  
hence the awkward poses)



Schematic cell diagram:  
(always put reduction on R)  
 $\text{Zn(s)} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Cu(s)}$

4