

CHEM 321

Electrochemical cells

1. Find the cell potential for the following cell. Express the cell potential in terms of pH for the unknown cell.
 $\text{Pt} / \text{H}_2 (\text{g}) 1 \text{ atm}, \text{H}^+ (1.0 \text{ M}) // \text{H}^+ (?), \text{H}_2 (\text{g}) 1 \text{ atm} / \text{Pt}$
2. Find K_a of the weak acid from a known cell potential
 $\text{Ag} / \text{AgCl}(\text{s}), 0.1 \text{ M KCl} // \text{CH}_3\text{COO}^-, \text{CH}_3\text{COOH}, \text{H}_2 (1 \text{ atm}) / \text{Pt}$
3. Calculate the cell potential for (a concentration cell):
 $\text{Ag} / \text{AgCl}(\text{s}), 0.1 \text{ M KCl} // 0.01 \text{ M KCl}, \text{AgCl}(\text{s}) / \text{Ag}$
4. Consider the titration of Ag^+ with I^- in an electrochemical cell. Find cell potential as a function of standard I^- added (0.1 M):
 $\text{Pt} / \text{H}_2 (\text{g}) 1 \text{ atm}, \text{H}^+ (1.0 \text{ M}) // \text{Ag}^+ (10.0 \text{ mL}, 0.1 \text{ M}) / \text{Ag}$
5. Setup a cell to measure K_w of water. Clearly draw the cell setup and write the cell notation. Consider the reaction: $\text{H}_2\text{O} = \text{H}^+ + \text{OH}^-$
6. Calculate the cell potential for the following cell:
 $\text{Hg} / \text{Hg}_2\text{Cl}_2(\text{s}), 1.0 \text{ M KCl} // \text{Fe}^{3+} (0.10 \text{ M}) / \text{Fe}$

(Obtain all E^0 from the table of standard reduction potential)