Problem of the Week  
November 30, 2001  
Exam-Like Problems for Review

1. Solubility Equilibrium Potpourri: Use the table of $K_{sp}$ values in your textbook, if you need to.

Milk of Magnesia contains Mg(OH)$_2$. At 25°C, the $K_{sp}$ for Mg(OH)$_2$ is $1.2 \times 10^{-11}$. What is the pH of a saturated solution of Mg(OH)$_2$?

What is the molar solubility of AgBr in water? What is the molar solubility of AgBr in a 0.04 M solution of NaBr?
1. More Solubility Equilibrium Potpourri: Use the table of Ksp values in your textbook, if you need to.

Will a precipitate of Fe(OH)_3 form when 1 drop of 8.0 M NaOH is added to 100 mL of 0.20 M FeCl_3? Remember that 1 drop = 20.0 mL.

What is the molar solubility of Cu(OH)_2 in pure water? What is its molar solubility in a buffer solution of pH 10.0? For Cu(OH)_2, $K_{sp} = 2.5 \times 10^{-16}$. 
2. Consider the electrochemical cell described below:

\[ \text{Zn} | \text{Zn}^{2+} || \text{Al}^{3+} | \text{Al} \]

Write the oxidation and reduction half reaction and the overall cell reaction.

Sketch the cell and label the cathode, anode, and salt bridge. Next to each electrode write the half-reaction taking place the material that makes up the electrode and its electrical charge. Show the direction of ion flow in the salt bridge and in the half-cells. Show the direction of electron flow in an external circuit.
2. Continued

Use the data in your text book to look up the following information about the overall cell reaction.

\[ E^\circ = \]

Use the above data to calculate the following information about the reaction:

\[ \Delta G^\circ = \]

\[ K = \]

How would each value change if you doubled the amounts of material undergoing reaction in the cell?

\[ E^\circ : \]
\[ \Delta G^\circ : \]
\[ K : \]
reversed the cell reaction?

\[ E^\circ : \]
\[ \Delta G^\circ : \]
\[ K : \]