

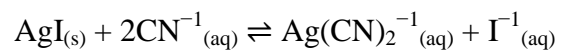
CHM 1046  
Professor Fowler  
Chapter 17 Homework

1. Review Example 17.01 and page 1 of the chapter 17 notes. Define solubility product. Write the balanced reaction and  $K_{SP}$  (solubility product) expression for dissolving  $AgI_{(s)}$ . (1 pt)
  
2. Review Examples 17.02, 17.03, and [15.3](#). Review page 1 of the chapter 17 notes also. Define molar solubility. If  $K_{SP} = 8.3 \times 10^{-17}$  for  $AgI$ , use an equilibrium table to determine  $[Ag^{+1}_{(aq)}]$  and  $[I^{-1}_{(aq)}]$  in a solution that is saturated with  $AgI$  only. Then, determine the molar solubility in g/L as well, where the molar mass is 234.8 g/mol. (2 pts)
  
3. Review Example 17.05 and Common Ion Effect on page 1 of the chapter 17 notes. Describe the common ion effect in terms of LeChatelier's principle and molar solubility. Include how the solubility reaction's equilibrium will shift when a product ion is added. Use an equilibrium table to determine  $[Ag^{+1}_{(aq)}]$  for a solution that is not only saturated with  $AgI_{(s)}$ , but also has a common ion effect from dissolved  $NaI$  so that  $[I^{-1}_{(aq)}] = 0.10 M$ . Then, determine the molar solubility in g/L. (2 pts)

4. Review Complex Ion Equilibria in the chapter 17 notes. Review [section 15.2](#) also. Describe the formation of a complex ion in terms of Lewis acids and bases. That is, describe the reaction's  $e^{-1}$  pair transfer. Then, write the balanced reaction and  $K_F$  (formation constant) expression for the formation of  $\text{Ag}(\text{CN})_2^{-1}(\text{aq})$ . Also, write the balanced dissociation reaction and its  $K_D$  (dissociation constant) expression. Include all phase subscripts, charges, and coefficients (exponents) in both of your reactions and both of your expressions. Refer to [Table 2.5](#) if necessary to identify the ligand. (2.5 pts)

5. Review Examples 17.09 and 17.10. If  $K_F = 5.6 \times 10^{18}$  for  $\text{Ag}(\text{CN})_2^{-1}(\text{aq})$ , determine the value of  $K_D$ . Write the equilibrium table for the dissociation reaction with a 1.25 M  $\text{Ag}(\text{CN})_2^{-1}(\text{aq})$  solution. Put the table results into the  $K_D$  expression, then determine  $[\text{Ag}^{+1}(\text{aq})]$  and  $[\text{CN}^{-1}(\text{aq})]$ . (1.5 pts)

6. Add the reaction for dissolving  $\text{AgI}_{(s)}$  (in #2) and the reaction which forms the  $\text{Ag}(\text{CN})_2^{-1}{}_{(aq)}$  complex ion (in #4) together to get the following sum:



Review Example 17.11. Show how the  $K_{\text{SP}}$  and  $K_{\text{F}}$  **expressions** for the two reactions (in #1 and #4) can be multiplied together to obtain the  $K_{\text{C}}$  **expression** for the sum reaction. Then, show how the  $K_{\text{SP}}$  and  $K_{\text{F}}$  **values** (in #2 and #5) can be multiplied together to determine the **value** of  $K_{\text{C}}$ . (1 pt)