General Chemistry II

PLI #12

July 27, 2021

1. What mass of ZnS (K_{Sp} = 2.5 x 10^{-22}) will dissolve in 300.0 mL of 0.050 M $Zn(NO_3)_2$? Ignore the basic properties of S^{2-}. "X" is negligible.

2. Predict whether the equivalence point of each of the following titration is below, above, or at pH 7.
   a. $NaHCO_3$ titrated with NaOH
   b. NH_3 titrated with HCl
   c. KOH titrated with HBr

3. Consider a beaker containing a saturated solution of CaF_2 in equilibrium with undissolved CaF_2. The molar solubility of CaF_2 at 35 degrees Celsius is 1.24 x 10^{-3} M.

   a. What are the expression and the value for K_{sp}?

   b. Solid $CaCl_2$ is then added to the solution. Will the amount of CaF_2 (s) increase, decrease, or remain the same? Explain

4. The molar solubility of PbBr2 is 2.17 x 10^{-3} M at a certain temperature. Calculate K_{sp} for $PbBr_2$.

5. What is the pH at which $Cr(OH)_3$, K_{sp} =6.3x 10^{-31}, just starts to precipitate from a 1.0 x 10^{-12} M Cr^{+3} solution?

6. Solution A is 1.0 L of pure water. Solution B is 1.0 L of 3.4x 10^{-2} M NaCl. How many more moles of AgCl (K_{sp}= 1.77x10^{-10}) dissolve in solution A than solution B? (Hint: for solution B, you can consider the change to be negligible compared to the initial concentration of Cl^-)