

REVIEW QUESTIONS

Chapter 17

1. Calculate the molar solubility of AgBr ($K_{sp} = 5.0 \times 10^{-13}$) in 0.50 M NaBr solution.

2. AgNO₃ is added to a solution that is 0.10 M in NaCl and 0.010 M K₂CrO₄. Assume no dilution caused by the addition of AgNO₃. Given the K_{sp} values below:

$$K_{sp} \text{ for AgCl} = 1.6 \times 10^{-10}$$
$$K_{sp} \text{ for Ag}_2\text{CrO}_4 = 9.0 \times 10^{-12}$$

- a) Which precipitates first, AgCl or Ag₂CrO₄? Calculate the [Ag⁺] when precipitation first begins.

- b) What is the [Cl⁻] when Ag₂CrO₄ first begins to precipitate?

3. A solution is made by mixing 10.0 mL of 0.10 M $\text{Pb}(\text{NO}_3)_2$ and 10.0 mL of 0.0010 M Na_2SO_4 . Will a precipitate form? (K_{sp} for $\text{PbSO}_4 = 1.06 \times 10^{-8}$)
4. The solubility of iron (II) hydroxide, $\text{Fe}(\text{OH})_2$, is 1.43×10^{-3} g/L.
- Calculate the K_{sp} for iron (II) hydroxide.
 - Calculate pH of a saturated solution of iron (II) hydroxide.
 - A 50.0 mL sample of 3.00×10^{-3} M FeSO_4 solution is added to 50.0 mL of 4.00×10^{-6} M NaOH solution. Does a precipitate form?

5. Lead iodate, $\text{Pb}(\text{IO}_3)_2$, is a slightly soluble salt with a K_{sp} of 2.6×10^{-13} at 25°C . To 35.0 mL of 0.150 M $\text{Pb}(\text{NO}_3)_2$ solution is added 15.0 mL of 0.800 M KIO_3 . A precipitate of $\text{Pb}(\text{IO}_3)_2$ results. What are the $[\text{Pb}^{2+}]$ and $[\text{IO}_3^-]$ in the final solution?

6. What is the Cr^{3+} concentration when 0.010 mol of $\text{Cr}(\text{NO}_3)_3$ is dissolved in a liter of solution buffered at pH of 10.0. Cr^{3+} forms a complex ion with hydroxide shown below:



7. A 0.10-mol sample of AgNO_3 is dissolved in 1.00 L of 1.00 M NH_3 . If 0.010 mol of NaCl is added to this solution, will AgCl ($K_{\text{sp}} = 1.8 \times 10^{-10}$) precipitate? (Ag^+ and NH_3 form the complex ion $[\text{Ag}(\text{NH}_3)_2]^+$ with $K_f = 1.6 \times 10^7$)