Problem Set 9.04
Predicting if a Precipitate Will Form

Complete these problems on a separate sheet of paper.

1. A saturated solution of silver phosphate is found to contain $1.3 \times 10^{-4}$ M silver ion and $4.3 \times 10^{-5}$ M phosphate ion. What is the $K_{sp}$ of $\text{Ag}_3\text{PO}_4$?

2. A solution of $\text{FeCl}_2$ is $1.3 \times 10^{-4}$ M. It is mixed with a solution of $2.4 \times 10^{-6}$ M $\text{Na}_2\text{S}$ solution.
   a. What are the formulas of the two possible precipitates that could form?
   b. Will a precipitate form when 10.0 mL of each of the two solutions are mixed? $K_{sp} \text{FeS} = 4.0 \times 10^{-19}$

3. Determine if a precipitate will form when 25.0 mL of 0.0550 M $\text{Mg(NO}_3)_2$ is mixed with 25.0 mL of 0.0150 M $\text{NaOH}$. $K_{sp} \text{Mg(OH)}_2 = 8.9 \times 10^{-12}$

4. Two solutions are mixed. Predict if a precipitate will form if 10.0 mL of 0.010 M $\text{NaF}$ is mixed with 10.0 mL of 0.010 M $\text{Ba(NO}_3)_2$. $K_{sp} \text{BaF}_2 = 2.4 \times 10^{-5}$.

5. Two solutions are mixed. Predict if a precipitate will form if 25.0 mL of 0.0020 M silver nitrate solution, $\text{AgNO}_3$, is mixed with 25.0 mL of 0.0010 M sodium bromate solution, $\text{NaBrO}_3$. $K_{sp} \text{AgBrO}_3 = 5.30 \times 10^{-5}$

6. Two solutions are mixed. Predict if a precipitate will form if 25.0 mL of 0.0020 M barium iodide $\text{BaI}_2$, is mixed with 25.0 mL of 0.0010 M lead (II) nitrate solution, $\text{Pb(NO}_3)_2$. $K_{sp} \text{PbI}_2 = 7.1 \times 10^{-9}$

7. Two solutions are mixed. Predict if a precipitate will form if 5.0 mL of 0.0015 M lead (II) nitrate, $\text{Pb(NO}_3)_2$, is mixed with 5.0 mL of 0.0025 M barium hydroxide solution, $\text{Ba(OH)}_2$. $K_{sp} \text{Pb(OH)}_2 = 1.43 \times 10^{-20}$

8. Two solutions are mixed. Predict if a precipitate will form if 125.0 mL of 0.0015 M strontium chlorate, $\text{Sr(ClO}_3)_2$ is mixed with 75.0 mL of $2.5 \times 10^{-5}$ M sodium arsenate solution, $\text{Na}_3\text{AsO}_4$. $K_{sp} \text{Sr}_3(\text{AsO}_4)_2 = 4.29 \times 10^{-19}$