Answers to Practice Problems D in Page 510

Answers to Practice Problems D

1. $K_{sp} = 8.4 \times 10^{-12} = [Ag^+]^2(1.28 \times 10^{-4})$; $[Ag] = 2.6 \times 10^{-4}$
2. $[Pb]^{2+} = K_{sp}/[SO_4^{2-}] = 1.8 \times 10^{-8}/1.0 = 1.8 \times 10^{-8}$
3. $K_{sp} = 1.17 \times 10^{-5} = [Pb^{2+}](2.86 \times 10^{-2})^2$; $[Pb^{2+}] = 1.43 \times 10^{-2}$
4. $K_{sp} = 1.72 \times 10^{-7} = [Cu^+][Cl^-]$; $[Cu^+] = 4.15 \times 10^{-4}$

Additional Practice

a. Calculate the concentration of Ba^{2+} ion in a saturated solution of $BaSO_4$ both before and after the SO_4^{2-} concentration has been boosted to 0.010 M by the addition of Na_2SO_4. The K_{sp} of $BaSO_4$ is 1.1×10^{-10}. By what factor is the Ba^{2+} concentration decreased? **Ans.** 1.0×10^{-5} M; after: 1.1×10^{-8} M. The Ba^{2+} concentration is reduced to approximately 0.001 of its original concentration.

b. A chemist wishes to reduce the silver ion concentration in saturated AgCl solution to 2.0×10^{-6} M. What concentration of Cl^- would achieve this goal? **Ans.** $[Cl^-] = 9.0 \times 10^{-5}$

c. The K_{sp} of $MgCO_3$ is 6.8×10^{-6}. The concentration of CO_3^{2-} ions in a solution containing both $MgCO_3$ and Na_2CO_3 is 4.0×10^{-2} M. What is the concentration of magnesium ions if the solution is saturated with respect to $MgCO_3$? **Ans.** $[Mg^{2+}] = 1.7 \times 10^{-4}$

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