

1. Consider the following information for four sulfides:

CdS	3.6×10^{-29}	ZnS	4.9×10^{-18}	CuS	8.7×10^{-36}	PbS	8.4×10^{-28}
<u>Ksp Values</u>							

To saturated 1.0-L solutions of all the sulfides above, 100 mL of 0.01 M sodium sulfide is added. Which one of the following ions exists in lowest concentration at 25°C?

- a. Cd^{2+} b. Zn^{2+} c. Cu^{2+} d. Pb^{2+} e. S^{2-}

Least soluble

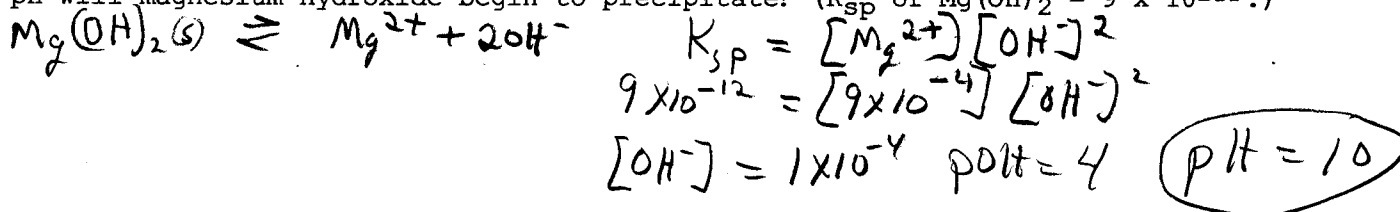
2. A saturated solution of $PbCl_2$ is prepared by dissolving the solid salt in water. The concentration of Cl^- in solution is found to be 0.032 M. Calculate the K_{sp} for $PbCl_2$.



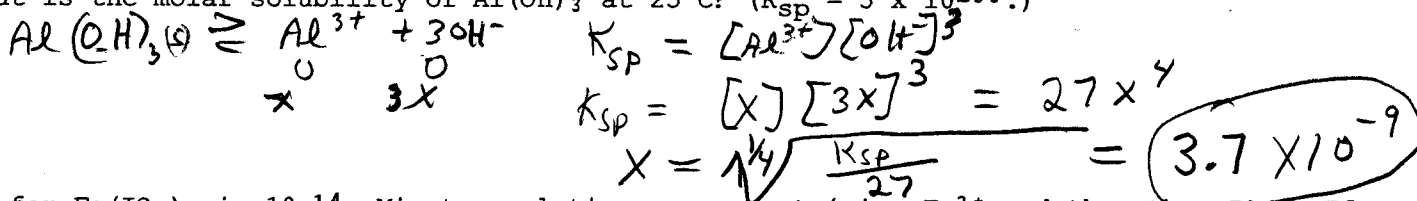
since $[Cl^-] = 0.032 = 2x$
 $[Pb^{2+}] = 0.016$

$$K_{sp} = 1.64 \times 10^{-5}$$

3. A 9.0×10^{-4} M $MgCl_2$ solution is gradually made more basic by adding sodium hydroxide. At what pH will magnesium hydroxide begin to precipitate? (K_{sp} of $Mg(OH)_2 = 9 \times 10^{-12}$.)

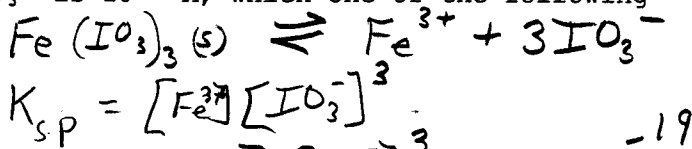


4. What is the molar solubility of $Al(OH)_3$ at 25°C? ($K_{sp} = 5 \times 10^{-33}$.)



5. K_{sp} for $Fe(IO_3)_3$ is 10^{-14} . Mix two solutions, one containing Fe^{3+} and the other IO_3^- . If, at the instant of mixing, Fe^{3+} is 10^{-4} M and IO_3^- is 10^{-5} M, which one of the following statements is true?

- a. A precipitate forms because $Q_{sp} > K_{sp}$.
 b. A precipitate forms because $Q_{sp} < K_{sp}$.
 c. No precipitate forms because $Q_{sp} > K_{sp}$.
 d. No precipitate forms because $Q_{sp} < K_{sp}$.
 e. None of these statements is true.

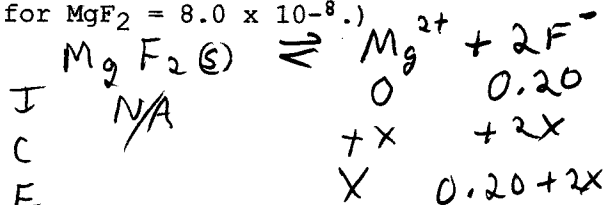


$$Q_{sp} = [10^{-4}][10^{-5}]^3 = 1 \times 10^{-19}$$

since $Q_{sp} < K_{sp}$ more will dissolve

6. What is the molar solubility of MgF_2 in a 0.20 M NaF solution?

(K_{sp} for $MgF_2 = 8.0 \times 10^{-8}$.)



$$K_{sp} = [Mg^{2+}][F^-]^2$$

$$K_{sp} = [x][0.20+2x]^2$$

Drop??

$$x = 2 \times 10^{-6} = [Mg^{2+}]$$

J
C
E