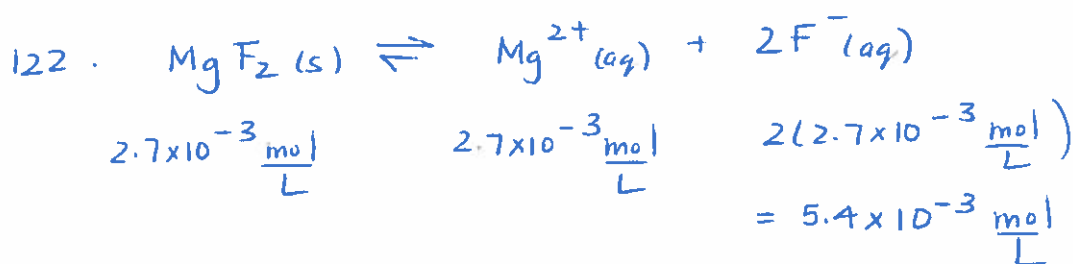


$$K_{sp} = [\text{Ag}^+][\text{Cl}^-]$$

$$= (1.3 \times 10^{-5})(1.3 \times 10^{-5})$$

$$= 1.7 \times 10^{-10}$$

\therefore the solubility-product constant is 1.7×10^{-10}

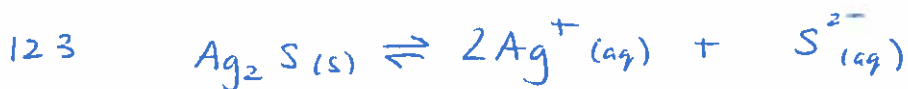


$$K_{sp} = [\text{Mg}^{2+}][\text{F}^-]^2$$

$$= (2.7 \times 10^{-3})(5.4 \times 10^{-3})^2$$

$$= 7.9 \times 10^{-8}$$

\therefore the solubility-product constant is 7.9×10^{-8}



I			
C	-x	+2x	+x
E	-x	+2x	+x

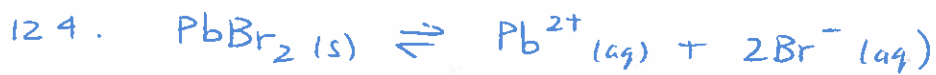
$$K_{sp} = [\text{Ag}^+]^2[\text{S}^{2-}]$$

$$5.6 \times 10^{-49} = (2x)^2(x)$$

$$5.6 \times 10^{-49} = 4x^3$$

$$x = 5.2 \times 10^{-17} \text{ mol/L}$$

\therefore the molar solubility of Ag_2S is $5.2 \times 10^{-17} \text{ mol/L}$



I			
C	-x	+x	+2x
E	-x	+x	+2x

$$K_{sp} = [\text{Pb}^{2+}][\text{Br}^{-}]^2$$

$$6.6 \times 10^{-6} = (x)(2x)^2$$

$$6.6 \times 10^{-6} = 4x^3$$

$$x = 0.01182 \text{ mol/L}$$

$$\begin{aligned} M_{\text{PbBr}_2} &= 207.2 + 2(79.904) \\ &= 367.008 \frac{\text{g}}{\text{mol}} \end{aligned}$$

$$\text{solubility} = \frac{367.008 \text{ g}}{\text{mol}} \times \frac{0.01182 \text{ mol}}{\text{L}}$$

$$= 4.3 \frac{\text{g}}{\text{L}}$$

∴ the solubility is

$$4.3 \frac{\text{g}}{\text{L}}$$



$$M = 143.321 \frac{\text{g}}{\text{mol}} \quad +x \quad +x$$

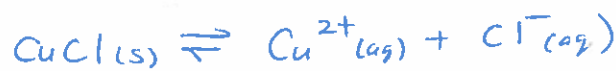
$$K_{sp} = [\text{Ag}^{+}][\text{Cl}^{-}]$$

$$1.77 \times 10^{-10} = x^2$$

$$x = 1.33 \times 10^{-5} \frac{\text{mol}}{\text{L}} \times \frac{143.321 \text{ g}}{\text{mol}}$$

$$= 0.00191 \frac{\text{g}}{\text{L}}$$

∴ 0.00191 g in 1 L



$$M = 98.999 \frac{\text{g}}{\text{mol}} \quad +x \quad +x$$

$$K_{sp} = [\text{Cu}^{2+}][\text{Cl}^{-}]$$

$$1.72 \times 10^{-9} = x^2$$

$$x = 4.15 \times 10^{-5} \frac{\text{mol}}{\text{L}} \times \frac{98.999 \text{ g}}{\text{mol}}$$

$$= 0.00411 \frac{\text{g}}{\text{L}}$$

∴ 0.00411 g in 1 L

∴ CuCl will have more mass ionize



$$M \text{Ni}_3(\text{PO}_4)_2 = \frac{366.020 \text{ g}}{\text{mol}}$$

$$[\text{Ni}_3(\text{PO}_4)_2] = \frac{7.8 \times 10^{-5} \text{ g}}{\text{L}} \times \frac{1 \text{ mol}}{366.020 \text{ g}}$$

$$= 2.13 \times 10^{-7} \text{ mol/L}$$

$$[\text{Ni}^{2+}] = 3 [\text{Ni}_3(\text{PO}_4)_2] = 3 (2.13 \times 10^{-7} \text{ mol/L})$$

$$= 6.39 \times 10^{-7} \text{ mol/L}$$

$$[\text{PO}_4^{3-}] = 2 [\text{Ni}_3(\text{PO}_4)_2] = 2 (2.13 \times 10^{-7} \text{ mol/L})$$

$$= 4.26 \times 10^{-7} \text{ mol/L}$$

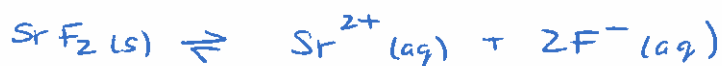
$$K_{sp} = [\text{Ni}^{2+}]^3 [\text{PO}_4^{3-}]^2$$

$$= (6.39 \times 10^{-7})^3 (4.26 \times 10^{-7})^2$$

$$= 4.74 \times 10^{-32}$$

∴ the solubility product constant is 4.74×10^{-32}

$$127 \quad M \text{SrF}_2 = 87.62 + 2(18.998) = 125.616 \frac{\text{g}}{\text{mol}}$$



$$[\text{SrF}_2] = \frac{12.2 \text{ mg}}{100 \text{ mL}} = \frac{0.122 \text{ g}}{\text{L}} \times \frac{1 \text{ mol}}{125.616 \text{ g}} = 0.000971 \frac{\text{mol}}{\text{L}}$$

$$[\text{Sr}^{2+}] = 9.71 \times 10^{-4} \text{ mol/L}$$

$$[\text{F}^{-}] = 2(9.71 \times 10^{-4} \text{ mol/L}) = 1.94 \times 10^{-3} \text{ mol/L}$$

$$K_{sp} = [\text{Sr}^{2+}][\text{F}^{-}]^2$$

$$= (9.71 \times 10^{-4})(1.94 \times 10^{-3})^2$$

$$= 3.65 \times 10^{-9}$$

∴ the solubility-product constant is

$$3.65 \times 10^{-9}$$



$[\text{AgNO}_3] =$



$$n_{\text{AgNO}_3} = 0.100 \frac{\text{mol}}{\text{L}} \times 0.001 \text{ L}$$

$$= 0.0001 \text{ mol}$$

$$n_{\text{NaCl}} = 1.00 \times 10^{-5} \frac{\text{mol}}{\text{L}} \times 1.00 \text{ L}$$

$$= 1.00 \times 10^{-5} \text{ mol}$$

$$\text{total } V = 1.00 \text{ L} + 0.001 \text{ L}$$

$$= 1.001 \text{ L}$$

$$[\text{Ag}^+] = \frac{0.0001 \text{ mol}}{1.001 \text{ L}}$$

$$= 9.99 \times 10^{-5} \text{ mol/L}$$

$$[\text{Cl}^-] = \frac{1.00 \times 10^{-5} \text{ mol}}{1.001 \text{ L}}$$

$$= 9.99 \times 10^{-6} \text{ mol/L}$$

$$Q_{\text{sp}} = [\text{Ag}^+][\text{Cl}^-]$$

$$= (9.99 \times 10^{-5})(9.99 \times 10^{-6})$$

$$= 9.98 \times 10^{-10}$$

$$K_{\text{sp}} = 1.77 \times 10^{-10}$$

$$Q_{\text{sp}} > K_{\text{sp}}$$

∴ a precipitate forms.