

Sapna Julla

Qsp ④ Predicting Precipitation

$$\left[\begin{array}{l} Q_{sp} > K_{sp} \quad \text{pptn occur} \\ Q_{sp} < K_{sp} \quad \text{no ppt} \end{array} \right]$$

① If 1.00 mg Na_2CrO_4 is added to 225 ml of ~~0.00015~~ 0.00015 M AgNO_3 , will ppt form?
 $K_{sp} = 1.1 \times 10^{-12}$ find conc. of ion.

$$1.00 \text{ mg } \text{Na}_2\text{CrO}_4 \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol } \text{Na}_2\text{CrO}_4}{162 \text{ g } \text{Na}_2\text{CrO}_4} \times \frac{1 \text{ mol } \text{CrO}_4^{\ominus}}{1 \text{ mol } \text{Na}_2\text{CrO}_4} = 6.17 \times 10^{-6} \text{ mol}$$

$$6.17 \times 10^{-6} \text{ mol} / 0.225 \text{ L} = 2.74 \times 10^{-5} \text{ M } [\text{CrO}_4^{\ominus}]$$

$$[\text{Ag}^{\oplus}] = 0.00015 \text{ M}$$



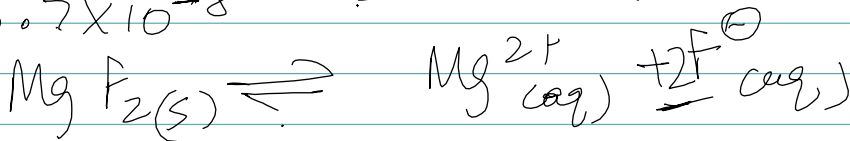
$$Q_{sp} = [\text{Ag}^{\oplus}]^2 [\text{CrO}_4^{2-}]$$

$$= (1.5 \times 10^{-4})^2 (2.74 \times 10^{-5})$$

$$= \boxed{6.2 \times 10^{-13}} < \boxed{1.1 \times 10^{-12}}$$

no pptn

② If 0.100 L of 0.0015 M MgCl_2 is added to 0.200 L of ~~0.00~~ 0.025 M NaF , will ppt of MgF_2 form?
 $K_{sp} = 3.7 \times 10^{-8}$



$$[\text{Mg}^{2+}] = \frac{0.100 \text{ L} \times 0.0015 \text{ mol}}{1 \text{ L}} \times \frac{1 \text{ mol } \text{Mg}^{2+}}{1 \text{ mol } \text{MgCl}_2} \times \frac{1}{0.300 \text{ L}} = 5.0 \times 10^{-4} \text{ M}$$

$$[\text{F}^{\ominus}] = \frac{0.200 \text{ L} \times 0.025 \text{ mol}}{1 \text{ L}} \times \frac{1 \text{ mol } \text{F}^{\ominus}}{1 \text{ mol } \text{NaF}} \times \frac{1}{0.300 \text{ L}} = 1.7 \times 10^{-2} \text{ M}$$

$$Q_{sp} = [\text{Mg}^{2+}] [\text{F}^{\ominus}]^2 = (5.0 \times 10^{-4}) (1.7 \times 10^{-2})^2$$

$$= \boxed{1.4 \times 10^{-7}} > \boxed{3.7 \times 10^{-8}} (K_{sp})$$

pptn