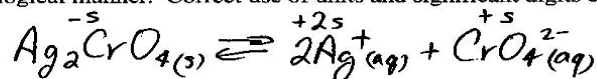10. Calculate the molar solubility of silver chromate in water at 25°C. Show all your steps in a logical manner. Correct use of units and significant digits counts (3 marks)

③

$$Ag_2CrO_{4(s)} \rightleftharpoons 2Ag^+_{(aq)} + CrO_4^{2-}_{(aq)}$$

(−s above Ag_2CrO_4, +2s above $2Ag^+$, +s above CrO_4)

$$K_{sp} = [Ag^+]^2[CrO_4^{2-}]$$
$$K_{sp} = (2s)^2 s$$
$$K_{sp} = 4s^3$$

$$s^3 = \frac{K_{sp}}{4} \quad or \quad s = \sqrt[3]{\frac{K_{sp}}{4}}$$
$$= \sqrt[3]{\frac{1.1\times10^{-12}}{4}}$$
$$= 6.5\times10^{-5} M$$

Answer $6.5\times10^{-5} M$

11. At a certain temperature 0.0558 grams of SrF_2 will dissolve in 500.0 mL of water. Calculate the Ksp for SrF_2 at this temperature. Show all your steps in a logical manner. Correct use of units and significant digits counts (3 marks)

③

$$g \rightarrow mol \rightarrow M$$

$$0.0558 g \, SrF_2 \times \frac{1 \, mol}{125.6 g} = 4.4427\times10^{-4} mol$$

$$M (molar \, solubility) = \frac{4.4427\times10^{-4} mol}{0.5000 L} = 8.885\times10^{-4} M.$$

$$SrF_{2(s)} \rightleftharpoons Sr^{2+}_{(aq)} + 2F^-_{(aq)}$$
(−8.885×10⁻⁴M, +8.885×10⁻⁴M, +1.777×10⁻³M)
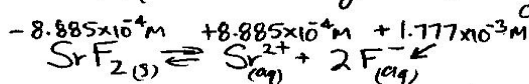
$$K_{sp} = [Sr^{2+}][F^-]^2$$
$$= (8.885\times10^{-4})(1.777\times10^{-3})^2$$

Answer $K_{sp} = 2.81\times10^{-9}$

12. Which is **most** soluble in water at 25 °C, lead (II) bromide, lead (II) chloride, lead (II) iodide, or lead (II) iodate? (2 marks)

② Answer $PbCl_2$. How did you obtain your answer? All the same type (AB₂) PbCl₂ has the highest ksp

13. Which is **least** soluble in water at 25 °C, lead (II) bromide, lead (II) chloride, lead (II) iodide, or lead (II) iodate? (2 marks)

② Answer $Pb(IO_3)_2$. How did you obtain your answer? All the same type. Pb(IO₃)₂ has the lowest Ksp.

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