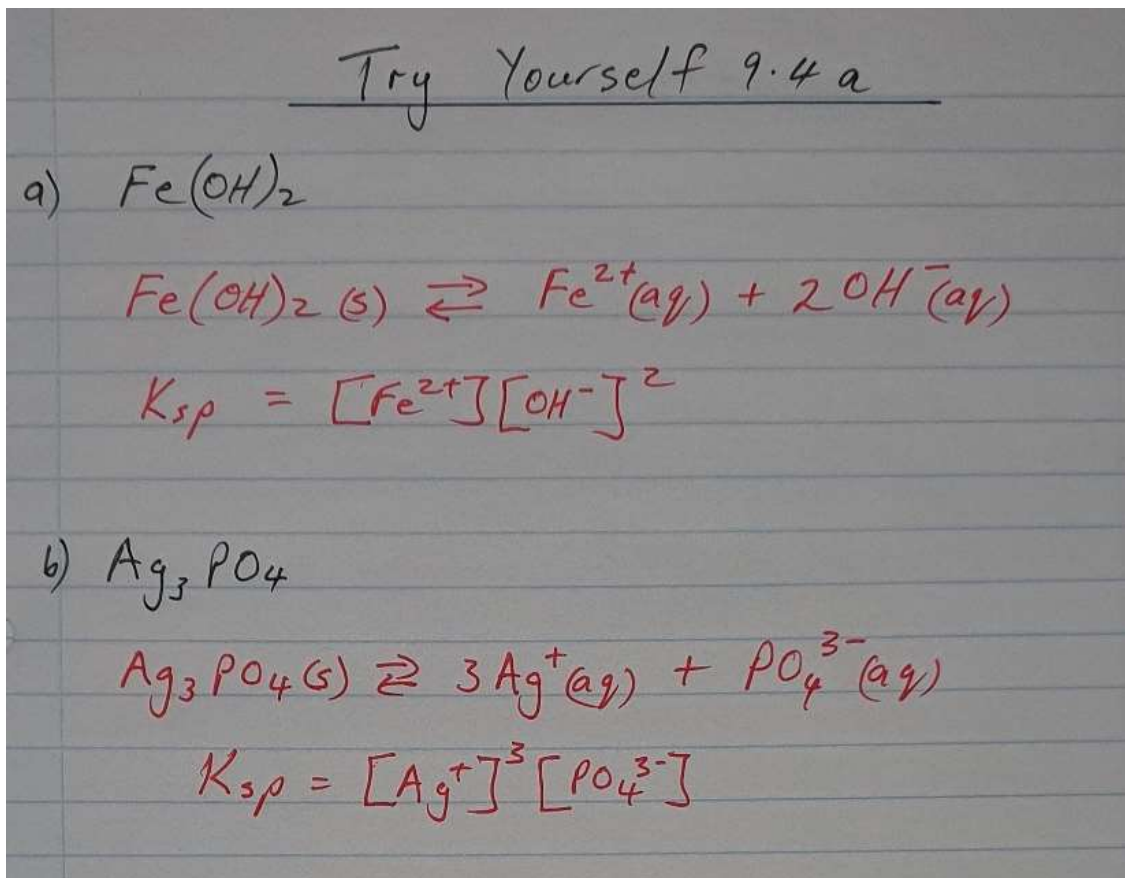


ANSWER TO "TRY YOURSELF" PROBLEM FROM STUDY SECTION 9.4

**Try Yourself 9.4a**

Write balanced reaction equations and the  $K_{sp}$  expression for each of the following slightly soluble salts:



### Try Yourself 9.4b

Calculate the solubility of  $\text{MgF}_2$  in moles per liter and in grams per liter.  $K_{sp}$  of  $\text{MgF}_2 = 5.2 \times 10^{-11}$  and  $M_{\text{MgF}_2} = 62.3 \text{ g}\cdot\text{mol}^{-1}$

Try Yourself 9.4b

$$\text{MgF}_2(s) \rightleftharpoons \text{Mg}^{2+}(aq) + 2\text{F}^{-}(aq) \quad K_{sp} = 5.2 \times 10^{-11}$$

I	—	}	0	0
C	—		+x	+2x
E	—		x	2x

$$K_{sp} = [\text{Mg}^{2+}][\text{F}^{-}]^2$$
$$x(2x)^2 = 5.2 \times 10^{-11}$$
$$4x^3 = 5.2 \times 10^{-11}$$
$$x = \sqrt[3]{5.2 \times 10^{-11} / 4}$$
$$x = 2.35 \times 10^{-4}$$
$$x = [\text{Mg}^{2+}] = 2.35 \times 10^{-4} \text{ M}$$

$\therefore [\text{Mg}^{2+}] = [\text{MgF}_2] = 1:1$   
 $\therefore [\text{MgF}_2] = 2.35 \times 10^{-4} \text{ M}$

If  $[\text{MgF}_2] = 2.35 \times 10^{-4} \text{ mol}\cdot\text{L}^{-1}$  it means that there is  $2.35 \times 10^{-4} \text{ mol}$  of  $\text{MgF}_2$  per Liter  $\text{H}_2\text{O}$ .

$$m = n \times M = (2.35 \times 10^{-4} \text{ mol}) (62.3 \text{ g}\cdot\text{mol}^{-1})$$
$$= 0.0146 \text{ g}$$
$$= 0.015 \text{ g} \rightarrow \therefore 0.015 \text{ g MgF}_2 / \text{L} \rightarrow$$