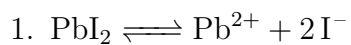


Chapter 15 — Problem Set 1

Michael Brodskiy

Instructor: Mr. Morgan

March 26, 2020



(a)

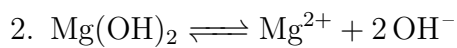
$$\begin{aligned} [\text{Pb}^{2+}] [\text{I}^-]^2 &= 10^{-8} \\ (x)(2x)^2 &= 10^{-8} \\ x &= \sqrt[3]{\frac{10^{-8}}{4}} \\ &= .00136[\text{M}] \end{aligned} \tag{1}$$

(b)

$$\begin{aligned} (x)(.01)^2 &= 10^{-8} \\ x &= \frac{10^{-8}}{(.01)^2} \\ &= 1 \cdot 10^{-4}[\text{M}] \end{aligned} \tag{2}$$

(c)

$$\begin{aligned} (.02)(2x)^2 &= 10^{-8} \\ x &= \sqrt{\frac{10^{-8}}{.08}} \\ &= 3.54 \cdot 10^{-4}[\text{M}] \end{aligned} \tag{3}$$



(a)

$$\begin{aligned} [\text{Mg}^{2+}] [\text{OH}^-]^2 &= 1.8 \cdot 10^{-11} \\ (x)(2x)^2 &= 1.8 \cdot 10^{-11} \\ x &= \sqrt[3]{\frac{1.8 \cdot 10^{-11}}{4}} \\ &= 1.65 \cdot 10^{-4}[\text{M}] \end{aligned} \quad (4)$$

(b)

$$\begin{aligned} (.1)(2x)^2 &= 1.8 \cdot 10^{-11} \\ x &= \sqrt{\frac{1.8 \cdot 10^{-11}}{.4}} \\ &= 6.7 \cdot 10^{-6}[\text{M}] \end{aligned} \quad (5)$$

(c)

$$\begin{aligned} (x)(.25)^2 &= 1.8 \cdot 10^{-11} \\ x &= \frac{1.8 \cdot 10^{-11}}{.125} \\ &= 2.88 \cdot 10^{-10}[\text{M}] \end{aligned} \quad (6)$$

3. (a)

$$\begin{aligned} .1 \cdot .00045 &= .000045[\text{mol}_{\text{Ag}^+}] \\ \frac{.000045}{.35} &= 1.286 \cdot 10^{-4}[\text{M}] \end{aligned} \quad (7)$$

(b)

$$\begin{aligned} .25 \cdot .00075 &= .0001875[\text{mol}_{\text{CrO}_4^{2-}}] \\ \frac{.0001875}{.35} &= 5.36 \cdot 10^{-4}[\text{M}] \end{aligned} \quad (8)$$

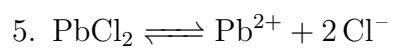
(c)

$$\begin{aligned} (1.286 \cdot 10^{-4})^2 (5.36 \cdot 10^{-4}) &= 8.86 \cdot 10^{-12} \\ 8.86 &> 2 \end{aligned} \quad (9)$$

So solid *is* formed

4.

$$\begin{aligned} (.00105)^2 (x) &= 6 \cdot 10^{-4} \\ x &= 544[\text{M}] \end{aligned} \quad (10)$$



$$\begin{aligned}
 (x)(2x)^2 &= 3.3 \cdot 10^{-3} \\
 x &= .0938[\text{M}] \\
 \frac{.0938 \cdot .756 \cdot 278}{(x)(2x)^2} &= 19.71[\text{g}] \text{ at } 80[^\circ \text{C}] \\
 (x)(2x)^2 &= 1.6 \cdot 10^{-5} \\
 x &= .0159[\text{M}] \\
 \frac{.0159 \cdot .756 \cdot 278}{19.71 - 3.336} &= 3.336[\text{g}] \text{ at } 25[^\circ \text{C}] \\
 19.71 - 3.336 &= 16.38[\text{g}]
 \end{aligned}
 \tag{11}$$