

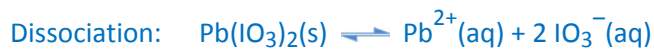
Ionic Equilibriums in Water



#8

The solubility product of $\text{Pb}(\text{IO}_3)_2$ is $2.6 \cdot 10^{-13}$ at 25°C . Calculate the solubility ($\frac{\text{mol}}{\text{L}}$) of $\text{Pb}(\text{IO}_3)_2$ at 25°C . The molar mass of $\text{Pb}(\text{IO}_3)_2$ is $557.0 \frac{\text{g}}{\text{mol}}$.

Solution



For every $\text{Pb}(\text{IO}_3)_2$ -particle going into solution, 1 Pb^{2+} -ion and 2 IO_3^{-} -ions are formed.

So: $[\text{Pb}^{2+}] = S$ and $[\text{IO}_3^{-}] = 2 \cdot S$

$$\text{Thus: } K_{sp} = [\text{Pb}^{2+}] \times [\text{IO}_3^{-}]^2 = S \times (2S)^2 = 4S^3$$

$$S = \sqrt[3]{\frac{K_{sp}}{4}} = \sqrt[3]{\frac{2.6 \times 10^{-13}}{4}} = \sqrt[3]{6.5 \times 10^{-14}} = 4.0 \times 10^{-5} \frac{\text{mol}}{\text{L}}$$