

Lecture 15.1 Solubility Equilibria

Note Title

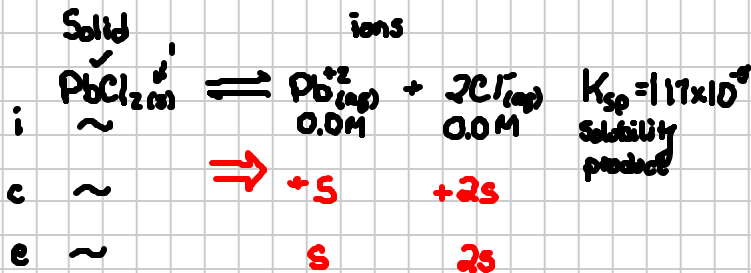
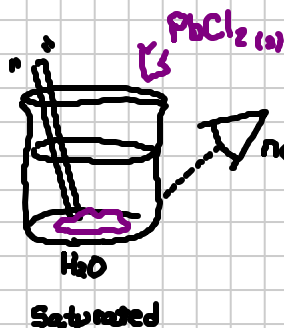
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Solubility: Maximum amount of solute that dissolves in a specific amount of solvent

Solubility Rules. NaCl Soluble in H₂O

PbCl₂ insoluble in H₂O
sparingly soluble in H₂O

* everything dissolves *



Law of Mass Action: $K_{sp} = [Pb^{2+}][Cl^-]^2$

$$1.7 \times 10^{-5} = (s)(2s)^2$$

$$1.7 \times 10^{-5} = 4s^3$$

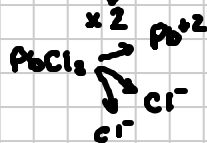
$$\sqrt[3]{\frac{1.7 \times 10^{-5}}{4}} = s$$

Equl Conc.

$$s = 1.43 \times 10^{-2}$$

$$[Pb^{2+}] = s = 1.43 \times 10^{-2} M = \frac{1.43 \times 10^{-2} \text{ mol Pb}^{2+}}{1L} \leftarrow \text{came from PbCl}_2(s) \text{ that dissolved}$$

$$[Cl^-] = 2s = 2.86 \times 10^{-2} M = \frac{2.86 \times 10^{-2} \text{ mol Cl}^-}{1L}$$



Molar Solubility $S = \frac{1.43 \times 10^{-2} \text{ mol PbCl}_2}{1L}$

Gram Solubility $G = \frac{\text{grams PbCl}_2}{1L} = \frac{1.43 \times 10^{-2} \text{ mol PbCl}_2}{1L} \cdot \frac{278.1059 \text{ g}}{1 \text{ mol}} = \frac{3.977 \text{ g PbCl}_2}{1L}$

