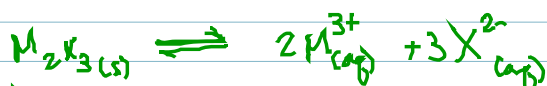


All ionic compounds will dissolve in H_2O
to some extent

insoluble \rightarrow does not dissolve well

$K_{sp} \Rightarrow$ solubility product constant

- \rightarrow the EQ constant for an ionic solid dissolving in H_2O
- \rightarrow the smaller the K_{sp} , the less the solid dissolves



ionic
compound

$$K = \frac{[M^{3+}]^2 [X^{2-}]^3}{[M_2X_3]}$$

$$K_{sp} = [M^{3+}]^2 [X^{2-}]^3$$

molar solubility (s) \Rightarrow the molarity of a solution when a solid has dissolved as much as it can

"saturated solution"

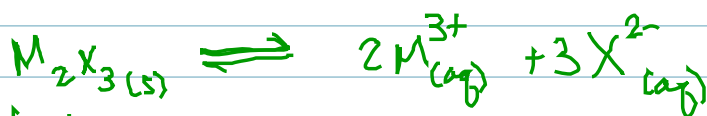
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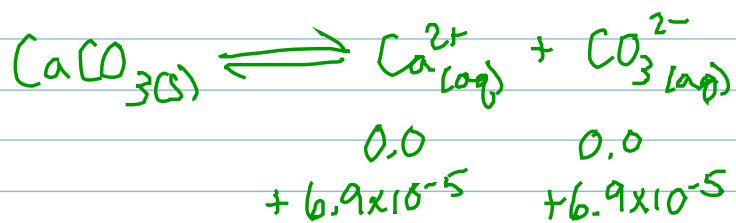
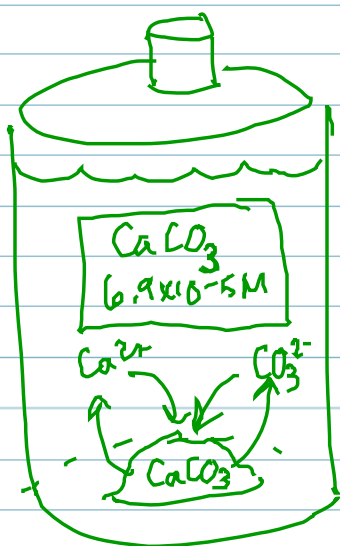
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5 types of K_{sp} problems

- ① given molar solubility \rightarrow find K_{sp}
- ② given K_{sp} \rightarrow find molar solubility
- ③ "will it precipitate?"
- ④ common ion effect
- ⑤ K_{sp} titration

A solution of CaCO_3 has a molar solubility of $6.9 \times 10^{-5} \text{ M}$. What is the K_{sp} ?



$$K_{sp} = [\text{Ca}^{2+}] [\text{CO}_3^{2-}]$$
$$= (6.9 \times 10^{-5})(6.9 \times 10^{-5})$$

$$K_{sp} = 4.8 \times 10^{-9}$$