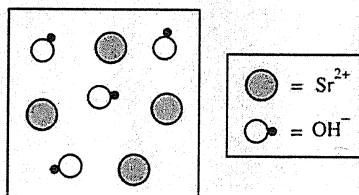
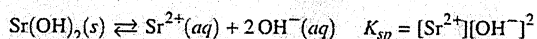


7. Strontium hydroxide dissolves in water according to the following equation. The K_{sp} expression for strontium hydroxide is provided.

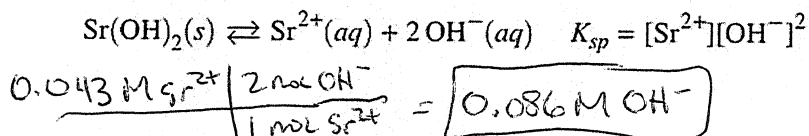


a) A student draws the particulate diagram shown to represent the ions present in an aqueous solution of $\text{Sr}(\text{OH})_2$. (Water molecules are intentionally omitted.) Identify the error in the student's drawing.

1 PT THE MOLE RATIO OF Sr^{2+} TO OH^- IS 1 TO 2. AS A RESULT, FOR THE FOUR Sr^{2+} IONS, THERE SHOULD BE 8 OH^- IONS DRAWN, NOT JUST 4.

b) The student prepares a saturated solution by adding excess $\text{Sr}(\text{OH})_2(s)$ to distilled water and stirring until no more solid dissolves. The student then determines that $[\text{Sr}^{2+}] = 0.043 \text{ M}$ in the solution.

(i) Calculate the value of $[\text{OH}^-]$ in the solution.



(ii) Calculate the value of K_{sp} for $\text{Sr}(\text{OH})_2$.

1 PT

$$K_{sp} = [\text{Sr}^{2+}][\text{OH}^-]^2 \rightarrow [0.043][0.086]^2$$

$$K_{sp} = 3.2 \times 10^{-4}$$

c) The student prepares a second saturated solution of $\text{Sr}(\text{OH})_2$ in aqueous $0.10 \text{ M } \text{Sr}(\text{NO}_3)_2$ instead of water. Will the value of $[\text{OH}^-]$ in the second solution be greater than, less than, or equal to the value in the first solution? Justify your answer. (Assume constant temperature.)

1 PT THE VALUE OF $[\text{OH}^-]$ WILL BE LESS THAN IT WAS IN THE 1ST SOLUTION. SINCE THE SOLUTION IS SATURATED, $Q = K$. BY INCREASING THE VALUE OF $[\text{Sr}^{2+}]$, THE VALUE OF $[\text{OH}^-]$ WILL HAVE TO DECREASE IN ORDER TO MAINTAIN $Q = K$ AS A SATURATED SOLUTION AT THIS TEMPERATURE.

$$Q = [\overset{\uparrow}{\text{Sr}^{2+}}][\text{OH}^-]^2$$

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