

CHEMISTRY DAILY PLAN

Class:

Date:

Subject: *Experimental Determination of Solubility Product*

Time:

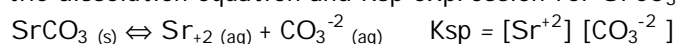
If the solubility of a compound is known, its solubility product can be calculated as illustrated in the following examples.

EXAMPLE 5 Calculation of K_{sp}

Problem : The concentration of each ion of Sr⁺² and CO₃⁻² is 2.5 x 10⁻⁵ mol/L in the saturated solution of SrCO₃ at 25 °C. What is the solubility product for SrCO₃ at this temperature?

Solution :

(1) Write the dissolution equation and K_{sp} expression for SrCO₃.



(2) Substitute the equilibrium concentrations of the ions into the solubility product expression for SrCO₃. $K_{\text{sp}} = (2.5 \times 10^{-5}) (2.5 \times 10^{-5}) = 6.25 \times 10^{-10}$

PROBLEMS IN CLASS: Determination of K_{sp}

Problem 1: A weighed amount of solid AgCl is ground up and thoroughly shaken with a liter of water at 25 °C, until the saturated solution is formed. Then the saturated solution is filtered, the residual solid AgCl is dried and weighed. If the loss in mass of AgCl is found 0.0019g, calculate the solubility product constant for AgCl at 25 °C. $\text{AgCl} = 143.5 \text{ g/mol}$.

Problem 2: A 2.5 L saturated solution of ferrous hydroxide at 25 °C contains 2.92 mg of Fe(OH)₂. Calculate the solubility product constant for Fe(OH)₂. $\text{Fe(OH)}_2 = 90 \text{ g/mol}$.

Problem 3: The concentration of PO₄⁻³ ions is found to be 3.0 x 10⁻⁷ M in a saturated zinc phosphate solution in pure water. What is the concentration of Zn⁺² ions? What is the solubility product of ZnPO₄?

Problem 4: Some Al(OH)₃ is added to water to form 1 liter of solution and shaken at laboratory temperature. Then the change in concentrations of ions is represented in a graph as a function of time. What is the solubility product constant for Al(OH)₃ at this temperature ?

