

Chemistry CP

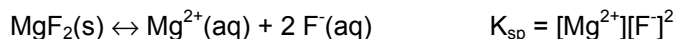
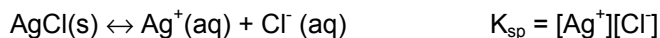
Name: _____

Solubility Constant (K_{sp}) Problems

Section: _____

Level 1

The **solubility product** is just the equilibrium constant for the dissolving of a slightly soluble solid. Here are some examples:



Since the reactant is always a solid, there is no denominator on solubility equilibrium expressions. Assume that the denominator is always "1".

There are two basic types of K_{sp} problems:

1. Give the solubility (also known as the concentration of a saturated solution), find the K_{sp} .
2. Given the K_{sp} , find the molarity or the concentration of a saturated solution (also known as the solubility) of the solid in question.

Watch out—these problems all use different ways of saying the same thing!

1. The solubility of AgI is 1.22×10^{-8} M. Find the K_{sp} of AgI.
Model Calculation:

General Problem-Solving Strategy

List what you know.

Write out the balanced ionization expression.

List known values. Identify the unknown(s).

Set up the problem.

Write the K_{sp} expression.

Estimate and calculate.

Substitute and evaluate. Use sig figs.

2. The concentration of a saturated solution of barium chromate, BaCrO_4 , is 9.2×10^{-6} M.
Calculate the K_{sp} of barium chromate. (8.5×10^{-11})
3. What is the K_{sp} of PbCl_2 if a saturated solution has a molarity of .002M? (3×10^{-8})
4. Find the K_{sp} of magnesium carbonate if a saturated solution is 3.2×10^{-8} M. (1.0×10^{-15})

5. The K_{sp} of lead (II) sulfate is 1.3×10^{-8} . Find the concentration of a saturated solution of $PbSO_4$.
Model Calculation:
6. If the K_{sp} of barium carbonate is 1.6×10^{-9} , what is the solubility of $BaCO_3$?
(4×10^{-5} M)
7. What will be the concentration of copper ions in a saturated solution of copper (II) carbonate, $CuCO_3$? (The K_{sp} of copper carbonate is 8.7×10^{-9}).
(9.3×10^{-5} M)
8. What is the molarity of a saturated solution of strontium fluoride, SrF_2 ? The K_{sp} of strontium fluoride is 7.9×10^{-10} . (Note: Be careful! Write the balanced equation first, then express the unknown concentrations of the ions in terms of each other.)
(.00058 M)