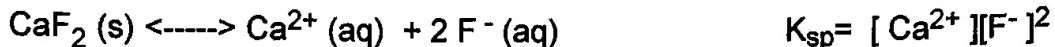


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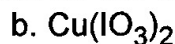
Chemistry 12  
Solubility Lesson #6  
**THE SOLUBILITY PRODUCT**

The specialized "equilibrium expression" for a saturated solution is called the "K<sub>sp</sub>" or the Solubility Product constant:



WE WILL USE THE "K<sub>sp</sub> TABLE" pg 5 of your Data Booklet IF WE ARE ASKED TO CALCULATE OR COMPARE RELATIVE SOLUBILITIES OF SUBSTANCES.

**Example 1:** Write out the K<sub>sp</sub> expressions for the following saturated solutions:



BECAUSE THE K<sub>sp</sub> DEPENDS ON THE CONCENTRATIONS OF THE IONS IN SOLUTION, THE \_\_\_\_\_ THE K<sub>sp</sub> VALUE THE \_\_\_\_\_ SOLUBLE THE SALT. THE \_\_\_\_\_ THE K<sub>sp</sub> VALUE THE \_\_\_\_\_ SOLUBLE THE SALT.

**Example 2.** Which of the following salts is the most soluble? Which is the least?  
BaSO<sub>4</sub>, K<sub>sp</sub> = 1.1 x 10<sup>-10</sup> BaCrO<sub>4</sub>, K<sub>sp</sub> = 1.2 x 10<sup>-10</sup> BaCO<sub>3</sub>, K<sub>sp</sub> = 2.6 x 10<sup>-9</sup>

**SOLVING K<sub>sp</sub> PROBLEMS:**

**THERE ARE TWO TYPES OF K<sub>sp</sub> PROBLEMS THAT YOU WILL ENCOUNTER**

**Type 1:**

**Type 2:**

Regardless of the type of problem you will start each problem by:

1st:

2nd:

**Example 3:** A Solution with a precipitate of  $\text{BaF}_2$  contains  $4.59 \times 10^{-2} \text{ M Ba}^{2+}$  and  $2.00 \times 10^{-3} \text{ M F}^-$ . What is the  $K_{\text{sp}}$  for  $\text{BaF}_2$  ?

1st:

2nd:

3rd:

**Example 4:** A saturated solution contains  $7.16 \times 10^{-3} \text{ mol}$  of  $\text{BaF}_2$  in  $2.00 \text{ L}$  of solution. What is the  $K_{\text{sp}}$  for  $\text{BaF}_2$  ?

1st:

2nd:

3rd:

4th:

**Example 5:** What is the  $[\text{Mg}^{2+}]$  in a saturated solution of  $\text{Mg}(\text{OH})_2$  ?

1st:

2nd:

3rd:

4th:

**Example 6.** What mass of  $\text{Mg}(\text{OH})_2$  will dissolve in 250 mL of water?

Carry out Steps 1-4 as in example #5

THEN: Convert the  $[\text{Mg}^{2+}]$  to mass of  $\text{Mg}(\text{OH})_2$  using STOICHIOMETRY!!!

**SEATWORK/HOMEWORK: Exercises 40-55 pgs 91-95**

**PLO's: I1- I4**