**SOLUBILITY PRODUCT PRACTICE PROBLEMS**

**http://www.vinstan.com/sch4u/solubilityproduct/solubility-product-practice-problems/**

**Solubility Practice Questions**

**Note:**

* Ksp Values can be obtained from any online resources or your text book.
* Trial Ksp is also sometimes referred to as Qsp
* Conditions for precipitation are Qsp > Ksp.
* **If Qsp = Ksp the system is in equilibrium i.e. a saturated solution**
* If Qso < Ksp there will be no precipitation taking place if the two solutions are mixed.

**Practice Questions**:

1. One liter of water is able to dissolve 2.15 x 10-3 mol of PbF2. What is the Ksp for PbF2?

5. What is the solubility in g/L of Ag2CO3 in water?

8. Will a precipitate of CaSO4 form in a solution if the Ca2+ concentration is 0.0025 M and the SO4– concentration is 0.030 M? For CaSO4, Ksp = 2.4 x 10-5.

9. Will a precipitate form in a solution containing 3.4 x 10-4 M CrO4-2 and 4.8 x 10-5 M Ag+?

10. Will a precipitate of PbSO4 form if 100 mL of 1.0 x 10-3 M Pb(NO3)2 solution is added to 100 mL of 2.0 x 10-3 M MgSO4solution?

11. Will a precipitate of PbCl2 form if 50.0 mL of 0.10 M Pb(NO3)2 solution is added to 20.0 mL of 0.040 M NaCl solution?

12. Barium Sulfate is so insoluble that it can be swallowed without significant danger, even though Ba2+is toxic. At 25oC, 1.00L of water dissolves only 0.00245 g of BaSO4. What is the Ksp of Barium Sulfate?

13. A student prepared a saturated solution of CaCrO4 and found that when 100 mL of this solution was evaporated, 0.416 g of CaCrO4 was left behind. What is the value of Ksp for this type?

15. At 25oC the value of Ksp for LiF is 1.7 x 10-3 and for BaF2, 1.7 x 10-6. In terms of moles per liter, which salt is the more soluble in water? Calculate the solubility of each in these units.

23. Drinking water often contains dissolved chloride and/or calcium ions. Devise a procedure to test which of these ions is present in a sample of tap water.

24. A solution contains a least 0.8 mol/L of each of the following ions: Ag+, Ba2+, Mg2+. Use a flow chart to illustrate a procedure that could be used to separate these ions from each other.

**Solubility Practice Questions: Solution**

**1.**

PbF2 <=>Pb2+ + 2F– C = n/v

2.15×10-3 2.15×10-3 4.3×10-3 C = 2.15×10-3 mol

1L

Ksp = [Pb2+][F–]2 C = 2.15×10-3 mol/L

Ksp = (2.15×10-3)(4.3×10-3)2

Ksp = 3.98×10-8

**5.**

Ag2CO3<=>2Ag+ + CO3 –Ksp = 8.1×10-12

2x x

Ksp = [Ag+]2[CO3–]

8.1×10-12= 4x3

x3 = 2.015×10-12

x = 1.3×10-4

∴ Molar solubility is 1.3×10-4

**8.**

Trial Ksp = [Ca][SO4]

Trial Ksp = (0.0025)(0.03)

Trial Ksp = 7.5×10-5Ksp = 2.4×10-5

∵ Trial Qsp > Ksp

∴ Precipitate will form

**9.**

Ksp = [Ag+]2[CrO4-2] Ag2CrO4=>2Ag+**+**CrO42-

Trial Ksp = (4.8×10-5)2(3.4×10-4)

Trial Ksp = 7.83×10-13

∵ Trial Qsp < Ksp

∴ No precipitate will form

**10.**

Pb(NO3)2 Pb+2+ 2NO3–MgSO4=>Mg2++ So42 –

C1V1= C2V2C1V1= C2V2

(1.0×10-3)(100) = C2(200) (2.0×10-3)(100) = C2(200)

C2= 5.0×10-4C2= 1×10-3

PbSO4=> Pb+ + SO42-

Trial Qsp = [Pb2+][SO42 –] Ksp = 6.3×10-7

Trial Qsp = (5.0×10-4)(1×10-3)

Trial Qsp = 5×10-7

∵ Trial Qsp < Ksp

∴ No precipitate will form

**11.**

**12.**

**13.**

**15.**

**23.**

**25.**