1/29/13

(1) when comparing free energy of pure solvent to free energy of solution formed by adding a solid solute to the solvent, free energy of solution is
- lower

X (2) which would have lowest vapor pressure?
- 1.5 M $MgCl_2$ aqueous solution
i = 3 so 4.5 M solution

(3) +10 points poll
what will happen if I add more solid salt to a saturated solution?
- the concentration of salt will remain same
(saturated means dissolved as much as will dissolve; if you add more solid, concentration will not change)

Solubility
- amt of solute that will dissolve given amt of solvent or solution

Molar Solubility - max # moles of solute that will dissolve in 1 L solution at given temp

(4) +10 points poll
How much of the rock dissolved?
- a tiny amount dissolved

(5) +10 points (poll)

WS-5) The molar solubility of $CaCl_2$ is

= 5.1 M

Given: $\frac{64.7\ g\ CaCl_2}{100\ g\ H_2O}$

Molar solubility = $\frac{\text{moles of solute}}{\text{Liter of solution}}$

g $CaCl_2$ → mol $CaCl_2$

g 100 g H_2O → solution → L solution

64.7 g $CaCl_2$	1 mol $CaCl_2$	1.435 g $CaCl_2$	1000 mL
164.7 g sol	111.07 g $CaCl_2$	1 mL	1 L

solution
100+64.7

5.1 M

Practice w/ NaCl : Answer 5.40 M

(6) +10 points (poll)

$K_{sp} = 8.7 \times 10^{-9}$

$CaCO_3(s) \longleftrightarrow Ca^{2+}(aq) + CO_3^{2-}(aq)$

Set up K_{sp} expression.

Solve for molar solubility of $CaCO_3$

9.3×10^{-5}

- same amount of Ca^{2+} as CO_3^{2-}

$[Ca^{2+}] = x = [CO_3^{2-}]$

$\sqrt{K_{sp}} = \sqrt{x^2}$

$Ca^{2+} = x = 9.3 \times 10^{-5}$

* brackets indicate molar units!

what is the solubility of AgCl?

$AgCl(s) \longleftrightarrow Ag^+(aq) + Cl^-(aq)$

$K_{sp} = [Ag^+][Cl^-] = 1.8 \times 10^{-10} = [x][x] = x^2$

reaction	$AgCl(s) \longleftrightarrow$	$Ag^+(aq)$ +	$Cl^-(aq)$
initial	same	0	0
change	$-x$	$+x$	$+x$
end / equilibrium	some $-x$	gain $+x$	gain $+x$

$[x][x] = x^2$

$x = \sqrt{K_{sp}}$

$x = 1.3 \times 10^{-5}$

$x = [Ag^+] = [Cl^-] = [AgCl]$

(7) +10 points (poll)

Given a generic formula, AX_2, where A is cation and X is anion, and molar solubility has been determined to be 1×10^{-4} M. Calc value of Ksp.

– $\boxed{4 \times 10^{-12}}$

$K_{sp} = [A^{2+}][X^-]^2 = [1 \times 10^{-4}][2 \times 10^{-4}]^2 =$

R	$AX_2(s) \rightarrow$	$A^{2+}(aq)$ +	$2X^-(aq)$
I	some	0	0
C	$-y$	$+y$	$+2y$
E	some $-y$	$+y$	$+2y$

(8) + 10 points (poll)

Which of the following has lowest molar solubility?

- $ZnSe$ $K_{sp} = 2 \times 10^{-25}$

(9)