

5.4 - Special K's - K_{sp} - Worksheet

1. Write the balanced equation and the solubility product constant expression, K_{sp} , for the each of the following dissociation reactions. All compounds are solids. One has been given as an example.

Reminders

- ion charges MUST BE included.
- solids (and liquids) are NOT included in the equilibrium expression
- don't forget to include exponents when needed
- polyatomic ions (e.g. CO_3^{2-}) do not break apart

Compound	Equation	K_{sp}
$(\text{NH}_4)_2\text{S}$	$(\text{NH}_4)_2\text{S (s)} \rightleftharpoons 2 \text{NH}_4^+(\text{aq}) + \text{S}^{2-}(\text{aq})$	$K_{sp} = [\text{NH}_4^+]^2[\text{S}^{2-}]$
CaS		
K_2SO_4		
$\text{Mg}(\text{OH})_2$		

2. Organize the following salts in order of solubility (highest to lowest):
 $\text{AgCl}; K_{sp} = 1.8 \times 10^{-10}$ $\text{AgI}; K_{sp} = 8.5 \times 10^{-17}$ $\text{AgBr}; K_{sp} = 5.4 \times 10^{-13}$
3. Calculate K_{sp} for a saturated nickel(II) sulfide, NiS, solution with a molar concentration (molarity) of 3.27×10^{-11} . Calculate the K_{sp} .
4. Calculate the concentration of ions in a saturated solution of CaCO_3 in water at 25°C . K_{sp} for CaCO_3 is 4.8×10^{-9} .

5. Calculate the concentrations of ions at 25°C for a saturated solution of silver bromate.
6. At 25°C, 0.0024 g of $\text{Ce}(\text{OH})_3$ is contained in a 2.5 L solution. Calculate K_{sp} .
7. What is the mass of fluoride ions present in a saturated 1.5 L solution of barium fluoride?