

# Exercise 18.4a

## Solubility Equilibria

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

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**DIRECTIONS:** Complete the following in the space provided:

- Write the dissociation equation and solubility product expression for each of the following:
  - lead (II) sulfate
  - silver chloride
  - $\text{Al}_2(\text{SO}_4)_3$
  - calcium phosphate
  - $\text{Zn}(\text{OH})_2$
- A sample of  $\text{MgCO}_3(\text{s})$  is added to pure water and allowed to come to equilibrium at  $25^\circ\text{C}$ . The concentration of  $\text{Mg}^{2+}$  is  $6.3 \times 10^{-3} \text{ M}$  at equilibrium. What is the value of  $K_{\text{sp}}$  for  $\text{MgCO}_3$ ?
- A sample of  $\text{MgF}_2(\text{s})$  is added to pure water and allowed to come to equilibrium at  $25^\circ\text{C}$ . The concentration of  $\text{Mg}^{2+}$  is  $1.17 \times 10^{-3} \text{ M}$  at equilibrium. What is the value of  $K_{\text{sp}}$  for  $\text{MgF}_2$ ?
- In a saturated solution of silver oxalate, the concentration of the silver ion is  $0.000340 \text{ M}$ . Calculate the value for  $K_{\text{sp}}$ .
- In a saturated solution of aluminum chromate, the concentration of the chromate ion is  $0.0990 \text{ M}$ . What is the value for the  $K_{\text{sp}}$ ?
- The  $K_{\text{sp}}$  for  $\text{HgS}$  is  $3.0 \times 10^{-53}$ . Explain what that means in terms of solubility.

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- If the  $K_{sp}$  for AgBr is  $4.90 \times 10^{-13}$ , and the concentration of silver and bromide ions are each  $9.1 \times 10^{-5} M$ , in a solution of silver bromide, will a precipitate form?
  - What is the concentration of silver ion in a saturated solution of silver chloride? ( $K_{sp} = 1.80 \times 10^{-10}$ )
  - What are the equilibrium concentrations of the dissolved ions in a saturated solution of  $CaCO_3$  at  $25^\circ C$ ? ( $K_{sp} = 8.7 \times 10^{-9}$ )
  - What are the equilibrium concentrations of the dissolved ions in a saturated solution of  $Fe(OH)_2$  at  $25^\circ C$ ? ( $K_{sp} = 1.2 \times 10^{-5}$ )
  - What are the equilibrium concentrations of the dissolved ions in a saturated solution of  $Ca(OH)_2$  at  $25^\circ C$ ? ( $K_{sp} = 1.3 \times 10^{-6}$ )
  - What are the equilibrium concentrations of the dissolved ions in a saturated solution of  $Ba_3(PO_4)_2$  at  $25^\circ C$ ? ( $K_{sp} = 1.3 \times 10^{-23}$ )