**Quiz 4**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. The Ksp for the mineral barite, BaSO4, is 1.1 × 10-10 at 25 °C (13 points).
	1. Calculate the solubility of BaSO4 in pure water.

|  |  |  |  |
| --- | --- | --- | --- |
|  | BaSO4 (s)  $\genfrac{}{}{0pt}{}{H\_{2}O}{⇌}$ | Ba2+ (aq) +  | SO42- (aq) |
| I |  | 0 M | 0 M |
| C |  | +2S | +S |
| E |  | 2S =2(1.1×10-5 M) =2.2×10-5 M | S =1.1×10-5 M |

$$K\_{sp}=[Ba^{2+}][SO\_{4}^{2-}]$$

$$K\_{sp}=(S)\left(S\right)$$

$$K\_{sp}=S^{2}⇒S=\sqrt{K\_{sp}}=\sqrt{1.1×10^{-10}}=1.1×10^{-5} M$$

Or

$$molar solublity=\sqrt[(a+b)]{\frac{K\_{sp}}{a^{a}b^{b}}}=\sqrt[(1+1)]{\frac{1.1×10^{-10}}{1^{1}×1^{1}}}=1.1×10^{-5} M$$

* 1. Calculate the solubility of BaSO4 in 0.010 M Ba(NO3)2.

|  |  |  |  |
| --- | --- | --- | --- |
|  | BaSO4 (s)  $\genfrac{}{}{0pt}{}{H\_{2}O}{⇌}$ | Ba2+ (aq) +  | SO42- (aq) |
| I |  | 0.010 M | 0 M |
| C |  | +S | +S |
| E |  | 0.010 M + S =0.010 M + 1.1×10-8 M =0.010 M | S =1.1×10-8 M |

$$K\_{sp}=[Ba^{2+}][SO\_{4}^{2-}]$$

$$K\_{sp}=(0.010 M+S)\left(S\right)$$

$$K\_{sp}=(0.010 M)\left(S\right)$$

$$S=\frac{K\_{sp}}{(0.010 M)}=\frac{1.1×10^{-10}}{(0.010 M)}=1.1×10^{-8} M$$

* 1. How would you expect the solubility to change if hydrochloric acid was added?

H+ (aq) + SO42- (aq) $⇌$ HSO4- (aq)

Bisulfate would be formed, so the equilibrium would shift to the right and solubility would increase.

1. Is today’s experiment quantitative or qualitative (2 points)? \_\_\_\_\_Depends on experiment