$10\ \mu g\ Ag^+ \times \frac{1g}{10^6\ \mu g} \times \frac{1\ mol}{107.89} =$ to Molarity

10 ppb = 9.3×10^{-8} M

100 ppb = 9.3×10^{-7} M

1. A concentration of 10-100 ppb (1 µg/L) by mass of Ag^+ is an effective disinfectant in swimming pools. Above 100 ppb Ag^+ has negative effects on health. Using Ksp values, calculate the equilibrium concentration of silver for the following silver salts. Determine the salt that would be the best choice to use in a pool. Circle your choice and show your work.

example a)

$AgBr(s) \rightleftharpoons Ag^+(aq) + Br^-(aq)$

a. AgBr — 7×10^{-7} M

b. AgCl — 1×10^{-5} M

c. AgI — 9×10^{-9} M

$AgBr(s) \rightleftharpoons Ag^+(aq) + Cl^-(aq)$

I: ∅ ∅

C: +x +x

E: x x

$K_{sp} = x^2$

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

2. Three cations, Sr^{+2}, Cu^{2+} and Ag^+ are separated using two different precipitating reagents. What precipitating reagents could be used? (you may need to use Ksp values in addition to solubility rules)

Challenge problem

Sr^{2+} Cu^{2+} Ag^+ — add Cl^- → $AgCl(s)$

Sr^{2+} Cu^{2+} add OH^- → $Cu(OH)_2$

Sr^{2+} flame test bright magenta

or add SO_4^{2-} for ppt

3. Calculate the molar solubility of AgI in (you will need to look up the Ksp for AgI)

$K_{sp} = 8.5 \times 10^{-17}$

a. Water

$AgI(s) \rightleftharpoons Ag^+(aq) + I^-(aq)$

I: ∅ ∅

C: +x +x

E: x x

$K_{sp} = x^2$

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

9×10^{-9} M

b. 0.100 M NaI

Na^+ 0.100 M

I^-

$AgI(s) \rightleftharpoons Ag^+(aq) + I^-(aq)$

I: ∅ 0.100 M

C: +x +x ignore

E: x 0.100

$K_{sp} = (x)(0.100)$

$$x = \frac{8.5 \times 10^{-14}}{0.100}$$

$$x = 8.5 \times 10^{-16}$$