Answer on the question #49132, Chemistry, Other

Question:

What is the solubility of AgI in g/L in a 0.040 M solution of MgI2? Ksp for AgI is 8.3 x 10^-17

Solution:

The equation of *AgI* dissociation is: (c(*MgI2*) = ½ c(I^-))

	$AgI = Ag^+$	+	I^-
c_0	-	0	0.08
Δc	-	x	x
$[c]$	-	x	0.08 + x

$$K_{sp} = [Ag][I] = 8.3 * 10^{-17}$$

$$K_{sp} = x(0.08 + x)$$

As x<< 0.04:

$$K_{sp} = 0.08 * x = 8.3 * 10^{-17}$$

$$x = 1.05 * 10^{-14} = c(Ag^+), \frac{mol}{L}$$

The solubility in g/L:

$$s = \frac{m(AgI)}{V(sol)} = \frac{n(AgI)M(AgI)}{V(sol)} = c(Ag^+) * M(AgI)$$

$$s = 1.05 * 10^{-15} * 234{,}77 = 2.45 * 10^{-13} \frac{g}{L}$$

Answer: $2.45 * 10^{-13} \frac{g}{L}$