Answer on Question #70646 – Chemistry – Other

Task:

What is the solubility, in moles per dm^3 of CO_3^{2-} ions in a saturated solution of silver carbonate Ag_2CO_3.

A) $1.15*10^{-4}$;

B) $1.15*10^{-6}$;

C) $2.48*10^{-4}$;

D) $2.48*10^{-6}$.

Solution:

The dissociation equation of silver carbonate:

$$Ag_2CO_3 \rightleftharpoons \underset{2s}{2Ag^+} + \underset{s}{CO_3^{2-}}$$

$$[Ag^+] = 2s;$$

$$[CO_3^{2-}] = s;$$

The expression for the solubility constant of silver carbonate:

$$\mathrm{K_s}(Ag_2CO_3) = [Ag^+]^2 * [CO_3^{2-}];$$

$$\mathrm{K_s}(Ag_2CO_3) = 6.15*10^{-12}.$$

Then,

$$\mathrm{K_s}(Ag_2CO_3) = [Ag^+]^2 * [CO_3^{2-}] = (2s)^2 * s = 4s^3 = 6.15*10^{-12}.$$

$$\mathrm{s}^3 = \frac{6.15*10^{-12}}{4} = 1.5375*10^{-12};$$

$$s = \sqrt[3]{1.5375*10^{-12}} = 1.15*10^{-4}\ (mol/dm^3).$$

Answer: A) $1.15*10^{-4}$ mol/dm^3.