

Answer on Question #53384 - Chemistry – General Chemistry

Question

Maple syrup has a density of 1.325 g/ml and 100.00g of maple syrup contains 67mg of calcium in the form of Ca^{2+} ions. What is the molarity of calcium in maple syrup?

Solution:

Assume we have 100.00 g of maple syrup, and then its volume is:

$$V = \frac{100.00}{1.325} = 75.47 \text{ ml}$$

We know that 100.00g of maple syrup contains 67mg of calcium in the form of Ca^{2+} ions.

So, number of moles in such amount of calcium ions is:

$$n(\text{Ca}^{2+}) = \frac{m(\text{Ca}^{2+})}{M(\text{Ca}^{2+})} = \frac{67}{40 \cdot 1000} = 1.675 \text{ mol}$$

Then the molarity of calcium in maple syrup is:

$$C_M = \frac{n(\text{Ca}^{2+})}{V} = \frac{1.675}{75.47} = 0.022 \frac{\text{mol}}{\text{L}} = 0.022 \text{ M}$$

Answer: 0.022 M