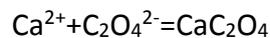


Answer on Question #49920 – Chemistry - Other

The calcium in a 300.0-mL sample of natural water was determined by precipitating the cation as CaC_2O_4 . The precipitate was filtered, washed, and ignited in a crucible with an empty mass of 26.80 g. The mass of the crucible plus CaO (56 g/mol) was 26.90 g. Calculate the concentration of Ca in water in units of gram/100 mL of the water.

Solution:



$$\begin{aligned}v(\text{CaC}_2\text{O}_4) &= v(\text{CaO}) = v(\text{Ca}^{2+}) \\v(\text{CaO}) &= \frac{m - m_0}{M_r} = \frac{26.90 - 26.80}{56.08} = 0.0018 \text{ mol} \\m(\text{Ca}^{2+}) &= 0.0018 \text{ mol} \times 40.078 \text{ g/mol} = 0.073 \text{ g} \\c(\text{Ca}^{2+}) &= \frac{m}{V(\text{H}_2\text{O})} = \frac{0.073 \text{ g}}{300 \text{ ml}} \times 100 = 0.024 \text{ g/100 ml}\end{aligned}$$

Answer: 0.024 g /100 mL of the water.