

Answer on Question#63312 – Chemistry – Inorganic chemistry

Question: Suppose 0.917g of sodium chloride is dissolved in 100.mL of a 54.0mM aqueous solution of silver nitrate. Calculate the final molarity of chloride anion in the solution. You can assume the volume of the solution doesn't change when the sodium chloride is dissolved in it. Round your answer to 3 significant digits

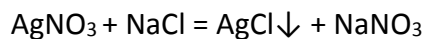
Solution:

$$n(\text{NaCl}) = \frac{m(\text{NaCl})}{M(\text{NaCl})} = \frac{0.917 \text{ g}}{58.5 \text{ g/mol}} = 0.0157 \text{ mol}$$

$$V(\text{solution}) = 100 \text{ mL} = 0.1\text{L}$$

$$C(\text{AgNO}_3) = 54.0 \text{ mM} = 0.054\text{M} = 0.054 \text{ mol/L}$$

$$n(\text{AgNO}_3) = C(\text{AgNO}_3) \times V(\text{solution}) = 0.054 \frac{\text{mol}}{\text{L}} \times 0.1\text{L} = 0.0054 \text{ mol}$$



$$n(\text{NaCl excess}) = 0.0157 \text{ mol} - 0.0054 \text{ mol} = 0.0103 \text{ mol}$$

$$C(\text{Cl}^-) = C(\text{NaCl excess}) = \frac{n(\text{NaCl excess})}{V(\text{solution})} = \frac{0.0103 \text{ mol}}{0.1 \text{ L}} = 0.103 \frac{\text{mol}}{\text{L}} = 0.103\text{M}$$

Answer: 0.103M.

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