

Answer on Question #73227, Chemistry / General Chemistry

The rate constant for the zeroth-order decomposition of NH_3 on a platinum surface at a given temperature is $3.63 \times 10^{-6} \text{ M/s}$. If the initial concentration of NH_3 is $3.23 \times 10^{-2} \text{ M}$, what is the concentration of NH_3 after 30.0 minutes?

Solution

Find how many seconds are in 30 minutes:

$$T = 30 \times 60 = 1800 \text{ (s)}$$

Find which amount of NH_3 will decompose after 30 minutes:

$$C_{\text{dec}} = 1800 \times 3.63 \times 10^{-6} = 6534 \times 10^{-6} = 0.65 \times 10^{-2} \text{ (M)}$$

Find the concentration after 30 minutes

$$C = 3.23 \times 10^{-2} - 0.65 \times 10^{-2} = \mathbf{2.58 \times 10^{-2} \text{ (M)}}$$

Answer

The concentration of NH_3 after 30.0 minutes is $\mathbf{2.58 \times 10^{-2} \text{ M}}$.

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