Activation energy

Calculate the activation energy for the reaction

$$N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2$$

given that the specific rate constants for the decomposition are 0.430 s^{-1} at 300 K and 697 s^{-1} at 500 K.

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Solution: Use the equation

$$E_a = \frac{-R \ln \frac{k_2}{k_1}}{\left(\frac{1}{T_2} - \frac{1}{T_1}\right)}$$

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Solution: Use the equation

$$E_a = \frac{-8.31 \ln \frac{697}{0.430}}{\left(\frac{1}{500} - \frac{1}{300}\right)} = 46{,}000\ J/mol$$