Answer on Question #83471 – Chemistry | General Chemistry
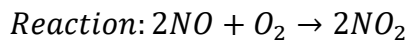
Given the reaction $2NO+O_2$ the rate of reaction is $7 \cdot 10^{-4}$ mol/L·s (O_2)=0.01mol/L NO =0.02mol/L calculate the rate constant.

Solution

Rate = $7 \cdot 10^{-4}$ mol/L·s

[NO] = 0.02 mol/L

[O_2] = 0.01 mol/L

$$Reaction: 2NO + O_2 \rightarrow 2NO_2$$

$$Rate = k[A]^m[B]^n$$

$$Rate = k[NO]^2[O_2]$$

$$k = \frac{Rate}{[NO]^2[O_2]} = \frac{7 \cdot 10^{-4} \text{mol/L} \cdot \text{s}}{(0.02 \, mol/L)^2 \cdot 0.1 \, mol/L} = 17.5 \frac{1}{s \cdot (mol/L)^2}$$

Answer

The rate constant must be $17.5 \frac{1}{s \cdot (mol/L)^2}$