IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iBrOx3

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$O + BrONO_2 \rightarrow$ products

k/cm^3 molecule^{-1} s^{-1}	Temp./K	Reference	Technique/ Comments
Absolute Rate Coefficients			
$1.91 \times 10^{-11} \exp[(215 \pm 30)/T]$	227-339	Soller et al., 2001	LP-RF (a)
3.93×10^{-11}	298		

Comments

(a) Measurements of $O(^3P)$ atom consumption rates under pseudo-first-order conditions with $BrONO_2$ in large excess.

Preferred Values

$k = 3.9 \times 10^{-11}$ cm^3 molecule^{-1} s^{-1} at 298 K.
$k = 1.9 \times 10^{-11} \exp(215/T)$ cm^3 molecule^{-1} s^{-1} over the temperature range 230 K to 330 K.

Reliability

$\Delta \log k = \pm 0.15$ at 298 K.
$\Delta(E/R) = \pm 100$ K.

Comments on Preferred Values

The preferred value is based on the study of Soller et al., (2001) in which the decay of $O(^3P)$ in the presence of excess $BrONO_2$ was monitored. Burkholder (2000) has studied the $O(^3P)$ + $BrONO_2$ reaction using pulsed laser photolysis with long-path transient absorption detection of NO_3. The NO_3 yield was found to be >0.85, suggesting that the primary product channel is $BrO + NO_3$.

References

Burkholder, J. B.: J. Chem. Phys. A. 104, 6733, 2000.
Soller, R., Nicovich, J. M., and Wine, P. H.: J. Chem. Phys. A. 105, 1416, 2001.