IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iBrOx2

This data sheet updated: 23th July 2003.

$O + BrO \rightarrow O_2 + Br$

$\Delta H° = -257$ kJ·mol^{-1}

k/cm^3 molecule^{-1} s^{-1}	Temp./K	Reference	Technique/ Comments
Absolute Rate Coefficients			
$(2.5\ ^{+2.5}_{-1.5})$ x 10^{-11}	298	Clyne et al., 1976	DF-RF (a)
1.9 x 10^{-11} exp[(230 ± 150)/T]	231-328	Thorn et al., 1995	PLP-A/RF (b)
(4.1 ± 0.6) x 10^{-11}	298		

Comments

(a) Measurements of O atom consumption rates and Br atom production rates in the O + Br_2 reaction were interpreted to give an estimate of $k(O + BrO \rightarrow O_2 + Br)$.
(b) Pulsed laser flash photolysis system with detection of BrO radicals by long path absorption and of O(^{3}P) atoms by resonance fluorescence.

Preferred Values

$k = 4.1$ x 10^{-11} cm^3 molecule^{-1} s^{-1} at 298 K.
$k = 1.9$ x 10^{-11} exp(230/T) cm^3 molecule^{-1} s^{-1} over the temperature range 230 K to 330 K.

Reliability

$\Delta \log k = \pm 0.2$ at 298 K.
$\Delta(E/R) = \pm 150$ K.

Comments on Preferred Values

The preferred value is based on the direct study of Thorn et al., (1995) in which the decay of O(^{3}P) in the presence of excess BrO was monitored. Clyne et al. (1976) derived an indirect estimate of the room temperature value which was approximately 40% lower than the preferred value given above.

References

Clyne, M. A. A., Monkhouse, P. B. and Townsend, L. W.: Int. J. Chem. Kinet. 8, 425, 1976.
Thorn, R. P., Cronkhite, J. M., Nicovich, J. M. and Wine, P. H.: J. Chem. Phys. 102, 4131, 1995.