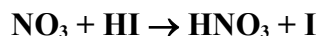


IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iIOx11

Website: <http://iupac.pole-ether.fr>. See website for latest evaluated data. Data sheets can be downloaded for personal use only and must not be re-transmitted or disseminated either electronically or in hard copy without explicit written permission.

This data sheet updated: 3rd February 2004.



$$\Delta H^\circ = -128.5 \text{ kJ}\cdot\text{mol}^{-1}$$

Rate coefficient data

$k/\text{cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$	Temp./K	Reference	Technique/ Comments
<i>Absolute Rate Coefficients</i>			
$1.3 \times 10^{-12} \exp[-(1830 \pm 300)/T]$	298-373	Lancar, Mellouki and Poulet, 1991 ¹	DF-EPR/MS (a)
$(2.5 \pm 0.8) \times 10^{-15}$	298		

Comments

- (a) NO₃ radicals were generated by the reaction of F atoms with HNO₃. The rate coefficient was determined by measuring the decay rate of NO₃ radicals (by MS, correcting for the contribution of HNO₃ to the m/z = 62 ion signal) or by measuring the formation rate of I atoms (by EPR).

Preferred Values

No recommendation.

Comments on Preferred Values

Although the rate coefficients measured in the only study¹ of this reaction from the decay of NO₃ using MS and I atom production using EPR spectrometry were in agreement,¹ there is a serious potential for secondary chemistry occurring in the system leading to an overestimation of the rate coefficient for the elementary process. Lancar *et al.*¹ reported that the reaction of I + NO₃ → IO + NO₂ does not occur, while Chambers *et al.*² observed that the I + NO₃ reaction is rapid, with a measured rate coefficient of $k(\text{I} + \text{NO}_3) = 4.5 \times 10^{-10} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$ at 298 K, and that I atoms are regenerated from subsequent reactions of IO radicals. Until this uncertainty is resolved, no recommendation can be made.

References

- ¹ I. T. Lancar, A. Mellouki, and G. Poulet, Chem. Phys. Lett. **177**, 554 (1991).
² R. M. Chambers, A. C. Heard, and R. P. Wayne, J. Phys. Chem. **96**, 3321 (1992).