IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iIOx14

This data sheet updated: 25th September 2003.

$$\mathbf{IO + O_3 \rightarrow I + 2O_2} \qquad \mathbf{(1)}$$
$$\mathbf{\rightarrow OIO + O_2} \qquad \mathbf{(2)}$$

$\Delta H°(1) = -151$ kJ·mol^{-1}

Rate coefficient data ($k = k_1 + k_2$)

k/cm^3 molecule^{-1} s^{-1}	Temp./K	Reference	Technique/ Comments
Absolute Rate Coefficients			
$k_1 < 1.2 \times 10^{-15}$	292	Larin *et al.*, 1999[1]	F-RF (a)
$k_2 < 2.3 \times 10^{-16}$	323		

Comments

(a) I atoms were generated by photolysis of CF_3I at 253.7 nm in a fast flow system using He as the carrier gas. Channel (1) was investigated by direct monitoring of I atom concentrations by resonance fluorescence and channel (2) was studied by monitoring the IO concentration by addition of NO and detection of the I atoms generated.

Preferred Values

$k_1 < 1 \times 10^{-15}$ cm^3 molecule^{-1} s^{-1} at 298 K.
$k_2 < 2 \times 10^{-16}$ cm^3 molecule^{-1} s^{-1} at 298 K.

Comments on Preferred Values

The only experimental study of the reaction[1] gives upper limits for the rate coefficients for the two channels which are substantially higher than the corresponding rate coefficients for the analogous reactions of FO, ClO, and BrO radicals. It is likely that the rate coefficients are substantially smaller but the measured upper limits are provisionally accepted.

References

[1] I. K. Larin, D. V. Nevozhai, A. I. Spasskii, E. F. M. Trofimova, and L. E. Turkin, Kinet. Katal. **40**, 487 (1999). Eng. Trans. p. 435.