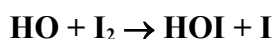


IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iIOx10

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

This datasheet last evaluated: 28th June 2007; no revision of preferred values.



$$\Delta H^\circ = -62.5 \text{ kJ}\cdot\text{mol}^{-1}$$

Rate coefficient data

$k/\text{cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$	Temp./K	Reference	Technique/ Comments
<i>Absolute Rate Coefficients</i>			
$(1.6^{+1.6}_{-0.8}) \times 10^{-10}$	298	Loewenstein and Anderson, 1985	DF-RF
$(2.10 \pm 0.60) \times 10^{-10}$	240-348	Gilles et al., 1999	PLP-LIF (a)
<i>Relative Rate Coefficients</i>			
$(2.3 \pm 0.3) \times 10^{-10}$	294	Jenkin et al., 1984	RR (b)

Comments

- (a) From measurements of the rate coefficients at 240 K, 293-295 K and 348 K, a least-squares analysis led to $k = 1.97 \times 10^{-10} \exp[(21 \pm 318)/T] \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$. The temperature independent expression cited in the table was preferred by Gilles et al. (1999).
- (b) Steady-state photolysis of HONO-I₂-ethene-air (or N₂) mixtures at 1 bar total pressure. A rate coefficient ratio $k(\text{HO} + \text{I}_2)/k(\text{HO} + \text{ethene}) = 26.5 \pm 3.5$ was obtained from the rate of disappearance of ethene as a function of the I₂ concentration. This rate coefficient ratio is placed on an absolute basis by use of a rate coefficient of $k(\text{HO} + \text{ethene}) = 8.69 \times 10^{-12} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$ at 294 K and 1 bar of air (Atkinson, 1997).

Preferred Values

$k = 2.1 \times 10^{-10} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$, independent of temperature over the range 240-350 K.

Reliability

$\Delta \log k = \pm 0.15$ at 298 K.

$\Delta(E/R) = \pm 300 \text{ K}$.

Comments on Preferred Values

The reported room temperature rate coefficients of Jenkin et al. (1984), Loewenstein and Anderson (1985) and Gilles et al. (1999) agree well, noting the large quoted error limits associated with the Loewenstein and Anderson (1985) data. The preferred values are based on the most recent and extensive study of Gilles et al. (1999). Loewenstein and Anderson (1985) determined that the exclusive products are HOI and I.

References

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- Jenkin, M. E., Clemitshaw, K. C. and Cox, R. A.: *J. Chem. Soc. Faraday Trans. 2*, 80, 1633, 1984.
- Loewenstein, L. M. and Anderson, J. G.: *J. Phys. Chem.* 89, 5371, 1985.