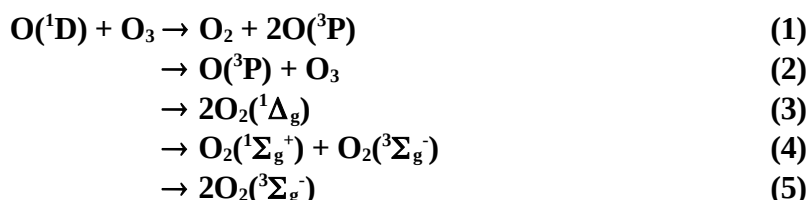


## IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet Ox4

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 retransmitted or disseminated either electronically or in hardcopy without explicit written permission.

This data sheet updated: 2<sup>nd</sup> October 2001.



$$\Delta H^\circ = -83.2 \text{ kJ}\cdot\text{mol}^{-1}$$

$$\Delta H^\circ = -189.7 \text{ kJ}\cdot\text{mol}^{-1}$$

$$\Delta H^\circ = -393.0 \text{ kJ}\cdot\text{mol}^{-1}$$

$$\Delta H^\circ = -424.7 \text{ kJ}\cdot\text{mol}^{-1}$$

$$\Delta H^\circ = -581.6 \text{ kJ}\cdot\text{mol}^{-1}$$

### Rate coefficient data ( $k = k_1 + k_2 + k_3 + k_4 + k_5$ )

$k/\text{cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$	Temp./K	Reference	Technique/ Comments
<i>Absolute Rate Coefficients</i>			
$(2.4 \pm 0.5) \times 10^{-10}$	103-393	Streit <i>et al.</i> , 1976 <sup>1</sup>	(a)
$(2.5 \pm 0.5) \times 10^{-10}$	300	Amimoto <i>et al.</i> , 1978 <sup>2</sup> ; 1980 <sup>3</sup>	PLP-RA (b)
$(2.28 \pm 0.23) \times 10^{-10}$	298	Wine and Ravishankara, 1981 <sup>4</sup>	PLP-RF (b)
$(2.5 \pm 0.2) \times 10^{-10}$	298	Greenblatt and Wiesenfeld, 1983 <sup>5</sup>	PLP-RF (b)
<i>Branching Ratios</i>			
$k_1/(k_3 + k_4 + k_5) = 1$	~298	Davenport <i>et al.</i> , 1972 <sup>6</sup>	FP-RF (b)
$k_1/k = 0.53$	298	Cobos, Castellano, and Schumacher, 1983 <sup>7</sup>	(c)
$k_5/k = 0.47$			

### Comments

- (a) O(<sup>1</sup>D) atoms produced by flash photolysis of O<sub>3</sub> in a flow system and detected by emission at 630 nm.
- (b) The product O(<sup>3</sup>P) atoms were detected by resonance absorption<sup>2,3</sup> or resonance fluorescence.<sup>4,5</sup>
- (c) Steady-state photolysis of pure O<sub>3</sub> and O<sub>3</sub>-inert gas mixtures. Ozone removal was monitored manometrically at high pressures and spectrophotometrically at lower pressures. The quantum yield of O<sub>3</sub> removal was interpreted in terms of a complex reaction scheme.

### Preferred Values

$k = 2.4 \times 10^{-10} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$ , independent of temperature over the range 100-400 K.  
 $k_1/k = k_5/k = 0.5$  at 298 K.

#### Reliability

$\Delta \log k = \pm 0.05$  over the temperature range 100-400 K.  
 $\Delta k_1/k = \Delta k_5/k = \pm 0.1$  at 298 K.

#### Comments on Preferred Values

The recommendation for the rate coefficient is based on the data of Streit *et al.*,<sup>1</sup> Amimoto *et al.*,<sup>2,3</sup> Wine and Ravishankara<sup>4</sup> and Greenblatt and Wiesenfeld.<sup>5</sup> The branching ratios are based on these studies plus the work of Davenport *et al.*<sup>6</sup> and Cobos *et al.*<sup>7</sup>

#### References

- <sup>1</sup> G. E. Streit, C. J. Howard, A. L. Schmeltekopf, J. A. Davidson, and H. I. Schiff, *J. Chem. Phys.* **65**, 4761 (1976); J. A. Davidson, C. M. Sadowski, H. I. Schiff, G. E. Streit, C. J. Howard, D. A. Jennings, and A. L. Schmeltekopf, *J. Chem. Phys.* **64**, 57 (1976).
- <sup>2</sup> S. T. Amimoto, A. P. Force, and J. R. Wiesenfeld, *Chem. Phys. Lett.* **60**, 40 (1978).
- <sup>3</sup> S. T. Amimoto, A. P. Force, J. R. Wiesenfeld, and R. H. Young, *J. Chem. Phys.* **73**, 1244 (1980).
- <sup>4</sup> P. H. Wine and A. R. Ravishankara, *Chem. Phys. Lett.* **77**, 103 (1981).
- <sup>5</sup> G. D. Greenblatt and J. R. Wiesenfeld, *J. Chem. Phys.* **789**, 4924 (1983).
- <sup>6</sup> J. Davenport, B. Ridley, H. I. Schiff, and K. H. Welge, *J. Chem. Soc. Faraday Disc.* **53**, 230 (1972).
- <sup>7</sup> C. Cobos, E. Castellano, and H. J. Schumacher, *J. Photochem.* **21**, 291 (1983).