IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet R_Oxygen_14

This datasheet updated: 12th June 2003.

$CH_2CH_2OH + O_2 \rightarrow$ products

Rate coefficient data

k/cm^3 molecule^{-1} s^{-1}	Temp./K	Reference	Technique/ Comments
Absolute Rate Coefficients			
$(3.0 \pm 0.4) \times 10^{-12}$	293	Miyoshi, Matsui and Washida, 1989[1]	PLP-MS (a)

Comments

(a) Pulsed laser photolysis of $ClCH_2CH_2OH$ and $BrCH_2CH_2OH$ in a large excess of He at total pressures of 2.7 mbar to 9.3 mbar (2 Torr to 7 Torr). CH_2CH_2OH radicals were monitored by photoionization MS in the presence of excess O_2.

Preferred Values

$k = 3.0 \times 10^{-12}$ cm^3 molecule^{-1} s^{-1} at 298 K.

Reliability

$\Delta \log k = \pm 0.3$ at 298 K.

Comments on Preferred Values

The direct measurements[1] of this rate coefficient, from the pulsed laser photolysis of either $ClCH_2CH_2OH$ or $BrCH_2CH_2OH$ as the radical source, showed a good level of consistency. By analogy with the reactions $C_2H_5 + O_2 + M \rightarrow C_2H_5O_2 + M$ and $CH_3CO + O_2 + M \rightarrow CH_3CO_3 + M$ (this evaluation), the rate coefficient for this reaction is expected to be close to the high-pressure limit under the experimental conditions employed. The UV absorption spectrum of the $HOCH_2CH_2O_2$ radical has been observed[2,3] by pulse radiolysis of SF_6-H_2O mixtures[2] and pulsed laser photolysis of H_2O_2 in the presence of C_2H_4 and O_2.[3] These observations indicate that the reaction between CH_2CH_2OH radicals and O_2 leads predominantly to the adduct peroxy radical.

References

1 A. Miyoshi, H. Matsui, and N. Washida, Chem. Phys. Lett. **160**, 291 (1989).
2 C. Anastasi, D. J. Muir, V. J. Simpson, and P. Pagsberg, J. Phys. Chem. **95**, 5791 (1991).
3 T. P. Murrells, M. E. Jenkin, S. J. Shalliker, and G. D. Hayman, J. Chem. Soc. Faraday Trans. **87**, 2351 (1991).