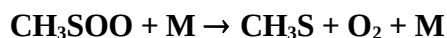


IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet SOx57

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: 19th November 2001.



$$\Delta H^\circ = 48.9 \text{ kJ}\cdot\text{mol}^{-1}$$

Rate coefficient data

k/s^{-1}	Temp./K	Reference	Technique/ Comments
<i>Absolute Rate Coefficients</i>			
$(1.99 \pm 0.74) \times 10^3$ 107 mbar (He)	216	Turnipseed, Barone and Ravishankara, 1992 ¹	(a)
$(3.20 \pm 0.80) \times 10^3$ 107 mbar (He)	222		
$(9.1 \pm 2.6) \times 10^3$ 107 mbar (He)	233		
$(1.00 \pm 0.12) \times 10^4$ 107 mbar (He)	237		
$(1.28 \pm 0.12) \times 10^4$ 107 mbar (He)	242		
$(2.4 \pm 0.4) \times 10^4$ 107 mbar (He)	250		
$>3.5 \times 10^4$ 107 mbar (He)	258		

Comments

- (a) Pulsed laser photolysis system with LIF detection of CH_3S radicals. The formation and decay rate coefficients of CH_3SOO radicals were derived from the observed time-concentration profiles of CH_3S radicals in the presence of O_2 . The measured rate coefficients for the reactions $\text{CH}_3\text{S} + \text{O}_2 \rightarrow \text{CH}_3\text{SOO}$ were observed to vary with total pressure and with the diluent gas.
- (b) See Comments on Preferred Values.

Preferred Values

Data of Turnipseed *et al.*,¹ given in above table. These data at 107 mbar He are described by $k(210\text{-}250 \text{ K}) = 3.5 \times 10^{10} \exp(-3560/T) \text{ s}^{-1}$.

Reliability

$\Delta \log k = \pm 0.3$ at 107 mbar He over the temperature range 216-250 K.

Comments on Preferred Values

The data presented by Turnipseed *et al.*¹ were the first reported for the dissociation of the CH₃SOO radical (see also the data sheet in this evaluation for the reverse reaction CH₃S + O₂ + M → CH₃SOO + M). In the atmosphere, ~33% of CH₃S radicals will be present as the CH₃SOO adduct at 298 K and ground level,¹ with the [CH₃SOO]/[CH₃S] ratio being strongly temperature dependent.¹

References

- ¹ A. A. Turnipseed, S. B. Barone, and A. R. Ravishankara, *J. Phys. Chem.* **96**, 7502 (1992).