IUPAC Task Group on Atmospheric chemical Kinetic Data Evaluation – Data Sheet PSOx4

This datasheet updated: 19th November 2001.

$CH_3SNO + h\upsilon \rightarrow$ products

Primary photochemical processes

Reaction	$\Delta H°/kJ \cdot mol^{-1}$	$\lambda_{threshold}/nm$
$CH_3SNO \rightarrow CH_3S + NO$ (1) $\rightarrow CH_3 + SNO$ (2)		

Absorption cross-section data

Wavelength/nm	Reference	Comments
190-430	Niki *et al.*, 1983[1]	(a)

Quantum yield data

No data available

Comments

(a) Cary 14 double beam spectrophotometer used; the spectral resolution was not reported. Measurements of σ were made over the range 190-600 nm, but only the results in the range 190-430 nm were given in graphical form. Values of $\sigma = 2.4 \times 10^{-20}$ and 5.8×10^{-20} cm^2 $molecule^{-1}$ were quoted for 510 and 545 nm, respectively. Values given in the table were taken from the graph. Temperature = 298 K.

Preferred Values

λ/nm	$10^{19}\sigma/cm^2$	λ/nm	$1019\sigma/cm^2$
190	5	310	14.9
195	104	320	18.5
200 (max)	162	330	21.3
205	91	335 (max)	21.6
210 (min)	81	340	21.5
215	98	350	19.6
218 (max)	104	360	16.5
220	96	370	12.7
225	73	380	9.6
230	40	390	6.7
240	16	400	4.5
250	3.5	410	2.9
260	1.7	420	2.0
264 (min)	1.5	430	1.3
270	1.8		
280	2.7	510	0.24
290	5.2	545	0.58
300	9.3		

Comments on Preferred Values

The spectrum of CH_3SNO consists of a weak transition in the 500-600 nm region showing some vibrational fine structure and stronger continuous bands at shorter wavelengths.[2] The CH_3S-NO dissociation energy has been estimated[3] to be approximately 110 kJ mol^{-1} but because more reliable data are not available we do not give wavelength limits for the dissociation channels tabulated.

The only available data for σ values in the gas phase appear to be those of Niki *et al*.[1] who have published their results mainly in the form of graphs covering the range 190-430 nm. Their published spectrum shows no fine structure but appears to consist of overlapping continua with three maxima at approximately 200, 218 and 335 nm. The preferred values of σ in the range 190-430 nm are taken from the graphs of Niki *et al*.[1] and cannot be considered to be very precise. The two values at 510 and 545 nm are numerical values quoted in the same study.[1]

There have been no quantum yield measurements. By analogy with CH_3ONO photolysis the primary products are expected to be CH_3S and NO. This is supported by the work of McCoustra and Pfab[2] who studied the photodissociation of CH_3SNO in a molecular beam and by the study of Niki *et al*.[1] who found CH_3SSCH_3 and NO to be the only major products from CH_3SNO photolysis at 300-400 nm.

References

1 H. Niki, P. D. Maker, C. M. Savage, and L. P. Breitenbach, J. Phys. Chem. **87**, 7 (1983).

2 M. R. S. McCoustra and J. Pfab, Chem. Phys. Lett. **137**, 355 (1987).

3 S. W. Benson, Chem. Rev. **78**, 23 (1978).