IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet PCl12

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$CH_3Cl + h\nu \rightarrow$ products

Primary photochemical processes

Reaction	$\Delta H°$/kJ·mol^{-1}	$\lambda_{threshold}$/nm
$CH_3Cl + h\nu \rightarrow CH_3 + Cl$	349	343

Preferred Values

Absorption cross-sections for CH_3Cl at 295 K and 210 K

λ/nm	10^{20} σ/cm^2	λ/nm	10^{20} σ/cm^2	
	295K[a]		295 K	210 K
174	111	8	2.66	2.43
6	93.8	200	1.76	1.51
8	76.6	2	1.13	0.93
180	60.7	4	0.750	0.573
2	46.7	6	0.483	0.345
4	35.0	8	0.318	0.212
6	25.5	210	0.206	0.130
8	18.2	2	0.132	0.080
190	12.7	4	0.086	0.047
2	8.72	6	0.055	0.027
4	5.88			
6	4.01			

[a]No temperature dependence at λ < 198 nm.

Comments on Preferred Values

The preferred values of the absorption cross-sections at 295 K and at 210 K are those reported by Simon *et al*.[1] This publication[1] reports the results of the most comprehensive study of the temperature dependence. These values are in very good agreement with the room temperature values reported by Robbins,[2] and are in reasonable agreement with the results of Hubrich *et al*.[3] who also made low temperature measurements. In the wavelength region 180-216 nm, photolysis occurs with unit quantum efficiency by breaking of the C-Cl bond to yield CH_3 + Cl. Photochemistry at shorter wavelengths is discussed by Shold and Rebbert.[4]

References

1 P. C. Simon, D. Gillotay, N. Vanlaethem-Meuree, and J. Wisemberg, J. Atmos. Chem. **7**, 107 (1988).

2 D. E. Robbins, Geophys. Res. Lett. **3**, 213 (1976); erratum op. cit. **3**, 757 (1976).

3 C. Hubrich, C. Zetzsch, and F. Stuhl, Ber. Bunsenges. Phys. Chem. **81**, 437 (1977).

4 D. M. Shold and R. E. Rebbert, J. Photochem. **9**, 499 (1978).