IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet PCl21

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This datasheet last evaluated: June 2015; last change in preferred values: December 2005.

CF_3CHFCl (HCFC-124) + hv → products

Primary photochemical processes

Reaction	$\Delta H°$/kJ·mol^{-1}	$\lambda_{threshold}$/nm
$CF_3CHFCl + hv \rightarrow CF_3CHF + Cl$	335 (est)	360

Preferred Values

Absorption cross-sections for CF_3CHFCl at 298 K and 210 K

λ/nm	10^{20} σ/cm^2		λ/nm	10^{20} σ/cm^2	
	298 K	210 K		298 K	210 K
190	0.77	0.62	210	0.018	0.010
2	0.55	0.42	2	0.012	0.006
4	0.39	0.29	4	0.008	0.004
6	0.27	0.19	6	0.006	0.003
8	0.18	0.13	8	0.004	0.002
200	0.13	0.084	220	0.003	0.0011
2	0.086	0.055	2	0.002	0.0007
4	0.060	0.036	4	0.002	0.0005
6	0.040	0.023	6	0.001	0.0003
8	0.027	0.015	8	0.001	0.0002

Comments on Preferred Values

The preferred values of the absorption cross-sections at 298 K are the averages of the values reported by Orlando et al. (1991) and Gillotay and Simon (1991) which are in good agreement. Both studies investigated the temperature dependence down to about 210 K. The temperature dependences of Orlando et al. (1991) are greater for shorter wavelengths (<200 nm) and less for the longer wavelengths than those reported by Gillotay and Simon (1991). The low temperature values of Gillotay and Simon (1991) are

preferred, and their 210 K values are given in the table. Photolysis is expected to occur with unit quantum efficiency by breaking of the C-Cl bond to yield CF_3CHF + Cl.

References

Gillotay, D. and Simon, P. C.: J. Atmos. Chem. 13, 289, 1991.
Orlando, J. J., Burkholder, J. B., McKeen, S. A. and Ravishankara, A. R.: J. Geophys. Res. 96, 5013, 1991.