IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet IV.A2.78 oClOx4

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$O(^1D) + CH_3CFCl_2$ (HCFC-141b) $\rightarrow O(^3P) + CH_3CFCl_2$ (1)
$\rightarrow$ other products (2)

$\Delta H°(1) = -190$ kJ mol^{-1}

Rate coefficient data ($k = k_1 + k_2$)

k/cm^3 molecule^{-1} s^{-1}	Temp./K	Reference	Technique/ Comments
Absolute Rate Coefficients			
$(2.58 \pm 0.20) \times 10^{-10}$	298	Warren et al., 1991	PLP-RF
Branching Ratios			
$k_1/k = 0.31 \pm 0.05$	298	Warren et al., 1991	PLP-RF (a)

Comments

(a) Branching ratio was determined from the ratio of the $O(^3P)$ yield from $O(^1D) + CH_3CFCl_2$ relative to that for $O(^1D) + N_2$.

Preferred Values

Parameter	Value	T/K
k /cm^3 molecule^{-1} s^{-1}	2.6×10^{-10}	298
k_1/k	0.31	298
Reliability		
$\Delta \log k$	± 0.3	298
$\Delta(k_1/k)$	± 0.1	298

Comments on Preferred Values

The preferred value of k and the preferred value of the branching ratio k_1/k are based on the results of Warren et al. (1991), the only published study of this reaction. In these experiments, only $O(^3P)$ was monitored and therefore no direct information relating to the products of the chemical reaction of $O(^1D) + CH_3CFCl_2$ was obtained.

References

Warren, R., Gierczak, T. and Ravishankara, A. R.: Chem. Phys. Lett., 183, 403, 1991.