IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet SOx80

This data sheet last evaluated: June 2011; last change in preferred values: June 2011.

$Cl + SO_2F_2 \rightarrow$ products (1)

Rate coefficient data

k/cm^3 molecule^{-1} s^{-1}	T/K	Reference	Technique/ Comments
Relative Rate Coefficients			
$< 5 \times 10^{-17}$	296	Papadimitriou et al., 2008	(a)
$< 9 \times 10^{-19}$	298	Andersen et al., 2009	(b)

Comments

(a) 351 nm photolysis of Cl_2 used as Cl source. Depletion of SO_2F_2 and CH_2FCF_3 (reference reactant) was monitored by FTIR. No loss of SO_2F_2 was observed and the resulting upper limit to k was calculated using $k(Cl + CH_2FCF_3) = 1.5 \times 10^{-15}$ cm^3 molecule^{-1} s^{-1}.

(b) CW-Photolysis of Cl_2 as Cl source. Depletion of SO_2F_2 and CH_3CF_3 (reference reactant) was monitored by FTIR to derive $k(Cl + SO_2F_2) / k(Cl + CH_3CF_3) < 0.014$. This was converted to an upper limit for k using $k(Cl + CH_3CF_3) = 3.2 \times 10^{-17}$ cm^3 molecule^{-1} s^{-1} (IUPAC, 2011).

Preferred Values

Parameter	Value	T/K
k /cm^3 molecule^{-1} s^{-1}	$< 10^{-19}$	200-330 K

Comments on Preferred Values

Both studies of this reaction confirm that it is very slow. We adopt the (lower) experimental upper limit of Andersen et al., 2009 for the preferred value.

References

Andersen, M. P. S., Blake, D. R., Rowland, F. S., Hurley, M. D. and Wallington, T. J.: Env. Sci. Tech. 43, 1067-1070, 2009.

IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation, http://iupac.pole-ether.fr., 2011.

Papadimitriou, V. C., Portmann, R. W., Fahey, D. W., Muhle, J., Weiss, R. F. and Burkholder, J. B.: J. Phys. Chem. A 112, 12657-12666, 2008.