Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet V.A5.8 HNDT8

ClO + NAT → products

Experimental data

Parameter	Temp./K	Reference	Technique/ Comments
Uptake coefficients: γ $\gamma_{ss} = (8\pm4) \times 10^{-5}$	183	Kenner, Plumb and Ryan, 1993	CWFT-MS (b)

Comments

(b) Fast flow reactor with electron-impact MS. A 4-7 μm thick NAT film was deposited from a 3:1 gas phase mixture of H_2O:HNO_3 on top of a previously deposited 2-3 μm thick ice film. ClO was passed through the flow tube either continuously or in pulses. ClO was produced by microwave discharge of O_2 and Cl_2 in He or by first producing Cl atoms by microwave discharge of Cl_2 in He and reacting Cl with O_3. Both methods led to consistent observations of ClO uptake. The ClO pressure was about 6.3×10^{-6} mbar. Cl_2 could not be measured as product because of excess of Cl_2 present from the source. HCl could also not be measured due to a large background in the MS.

Preferred Values

Parameter	Value	T/K
γ	$< 1 \times 10^{-4}$	180 - 200

Reliability

$\Delta \log(\gamma)$	undetermined

Comments on Preferred Values

The most likely reactive fate of ClO on solid surfaces is surface recombination and secondary chemistry (Abbatt, 1996, McKeachie et al., 2004). The NAT films prepared by Kenner et al. (1993) were likely porous and possibly did not cover the entire ice surface area on which they were deposited, as cautioned by the authors. We therefore only recommend an upper limit to the uptake coefficient.

References

Abbatt, J. P. D.: Geophys. Res. Lett., 23, 1681-1684, 1996.

Kenner, R. D., Plumb, I. C., and Ryan, K. R.: Geophys. Res. Lett., 20, 193-196, 1993.

McKeachie, J. R., Appel, M. F., Kirchner, U., Schindler, R. N., and Benter, T.: J. Phys. Chem. B, 108, 16786-16797, 2004.