Task Group on Atmospheric chemical Kinetic Data Evaluation – Data Sheet V.A5.4 HNDT4

N_2O_5 + NAT

Experimental data

Parameter	Temp./K	Reference	Technique/ Comments
Experimental uptake coefficients: γ, γ_0			
$\gamma_0 = 0.13 \pm 0.03$	188	Quinlan et al., 1990	Knud-MS (a)
$\gamma = (6 \pm 3) \times 10^{-4}$	200	Hanson and Ravishankara, 1991	CWFT_CIMS (b)
$\gamma = 6 \times 10^{-4}$	191	Hanson and Ravishankara, 1992	CWFT_CIMS (c)
$\gamma = (3 \pm 1) \times 10^{-4}$	191	Hanson and Ravishankara, 1993	CWFT_CIMS (d)
Partition coefficients: K(cm)			
No measurements			

Comments

(a) The NAT films were prepared …γ drops from the maximum given in the Table to a value of 4×10^{-3}.

(b) A NAT layer 1 to 2 monolayers thick (2 to 4×10^{14} HNO_3 cm^{-2}) was prepared *in situ* by converting N_2O_5 into HNO_3 on the ice surface. No saturation of γ on NAT.

(c) Influence of the thickness of the substrate on γ was investigated. γ varied by a factor of no more than three and 1.5 for NAT and pure ice, respectively, when the thickness was varied from 1 to 100 μm. The conclusion is that there is no significant dependence of γ on thickness. Thus the relevant surface corresponded to the geometric area.

(d) This study further confirmed the independence of the measured uptake coefficients on the substrate thickness.

Preferred Values

Parameter	**Value**	**T/K**
α_s	>0.2	190 - 200
Reliability		
$\Delta \log (\alpha_s)$	± 0.3	190 - 200

Comments on Preferred Values

HCl interaction with specifically prepared HNO_3-hydrate surfaces at conditions corresponding to NAT stability regions, is reversible at low [HCl]...

References

Hanson, D.R. and Ravishankara, A.R.: J. Geophys. Res. 96, 5081 (1991).
Hanson, D.R. and Ravishankara, A.R.: J. Phys. Chem. 96, 2682 (1992).
Hanson, D.R. and Ravishankara, A.R.: J. Phys. Chem. 97, 2802 (1993a).
Quinlan, M.A., Reihs, C.M., Golden, D.M. and Tolbert, M.A.: J. Phys. Chem. 94, 3255 (1990).