

IUPAC Task Group on Atmospheric chemical Kinetic Data Evaluation – Data Sheet V.A5.4 HNNT4

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Data sheet last evaluated: April 2008; last change in preferred values: April 2008.

N₂O₅ + NAT

Experimental data

Parameter	Temp./K	Reference	Technique/ Comments
<i>Experimental uptake coefficients: γ, γ_0</i>			
$\gamma_0 = 0.13 \pm 0.03$	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)
<i>Partition coefficients: $K(cm)$</i>			
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} HNO₃ cm⁻²) was prepared *in situ* by converting N₂O₅ into HNO₃ 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 μ m. 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
<i>Reliability</i>		
$\Delta \log (\alpha_s)$	± 0.3	190 - 200

Comments on Preferred Values

HCl interaction with specifically prepared HNO₃-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., Reihls, C.M., Golden, D.M. and Tolbert, M.A.: J. Phys. Chem. 94, 3255 (1990).