IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet V.A1.4 HI4

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HO_2 + ice

Experimental data

Parameter	Temp./K	Reference	Technique/ Comments
Experimental uptake coefficients: γ, γ_0, γ_{ss}			
0.025 ± 0.005	223	Cooper and Abbatt, 1996	CWFT-RF (a)

Comments

(a) Flow tube operated at ≈ 1.3 mbar pressure of He. Ice film made by freezing water. HO_2 ($\leq 5 \times 10^{10}$ molecule cm^{-3}) was generated by the reaction of H_2O_2 with F atoms and was detected as HO following reaction with NO. HO_2 decays were exponential, and the loss at the surface was irreversible, so that $\gamma = \gamma_0 = \gamma_{ss}$.

Preferred Values

none

Reliability

$\Delta \log \gamma = 0.5$

Comments on Preferred Values

There is only one measurement of the uptake of HO_2 to an ice surface, which was conducted at a single temperature (Cooper and Abbatt, 1996). The limited dataset suggests that the uptake is irreversible (i.e. the surface does not saturate) at concentrations of HO_2 that far exceed those in the atmosphere. As information on the temperature and concentration dependence of the HO_2 uptake coefficient are not available, no recommendation is given. Analagous work on HO uptake by the same authors has shown that its uptake is driven by self-reaction on the surface. Further experimental work is required to test whether the same applies to HO_2, and to extend the database to other temperatures.

References

Cooper, P. L., and Abbatt, J. P. D.: J. Phys. Chem. 100, 2249-2254, 1996.