IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet VI.A1.2 HET_H2OL_2

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H_2O_2 + H_2O(l) → products

Experimental data

Parameter	Temp./K	Reference	Technique/ Comments
Accommodation coefficients: α_b			
0.32 ± 0.02	260	Worsnop et al., 1989	DT-TDL (a)
0.18 ± 0.02	273		
0.08 ± 0.02	292		

Comments

(a) Droplets (pH = 7) with interaction times from 0.7 to 14 ms. Initial H_2O_2 densities were in the range 1.5 to 15 × 10^{12} molecule cm^{-3}.

Preferred Values

Parameter	**Value**	**T/K**
α_b	1.3 × 10^{-6} exp (3230/*T*)	260 - 292
Reliability		
Δ (E/R)	± 500 K	260-292

Comments on Preferred Values

We adopt the single dataset of Worsnop et al. as the basis of our recommendation. The temperature dependence of α_b was suggested to derive from an activation energy necessary to overcome a barrier between a precursor state and the solvated state of H_2O_2. The title reaction therefore represents a complex reaction involving a preequilibrium whose temperature dependence affects the overall T-dependence of the uptake.

References

Worsnop, D.R., Zahniser, M.S., Kolb, C.E., Gardner, J.A., Watson, L.R., Van Doren, J.M., Jayne, J.T. and Davidovits, P.: J. Phys. Chem., 93, 1159-1172, 1989.