

IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet HET_Org08

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This datasheet last evaluated: June 2017; last change in preferred values: June 2017

HO₂ + alkenes → products

Experimental data

substrate	RH / %	Temp./K	p(HO ₂) / mbar	Reference	Technique/ Comments	
<i>Uptake coefficients: γ</i>						
< 0.004	squalene	32	293±2	4×10 ⁻⁸	Lakey et al., 2015	AFT-LIF (a)

Comments

(a) Uptake of HO₂ to oleic acid and squalene particles generated by homogeneous nucleation (peak surface area weighted diameter of 84 nm, aerosol surface area up to 10⁻⁴ cm² cm⁻³). HO₂ was generated by the photolysis of H₂O in N₂ or air and detected as OH (by LIF) following conversion in reaction with NO.

Preferred Values

Parameter	Value	T/K
γ	< 0.004	290 – 300

Comments on Preferred Values

Uptake coefficients of HO₂ to aerosol particles containing alkenes are lower than those to deliquesced aqueous particles containing dissolved organic components. The single study by Lakey et al. (2015) using liquid squalene leads to the preferred upper limit to γ . Bulk phase rate coefficients of HO₂ with alkenes are too low (in the range of 10³ M⁻¹ s⁻¹, Bielski et al., 1985) to drive uptake above the detection limits of the Lakey et al. (2015) study.

References

- Lakey, P. S. J., George, I. J., Whalley, L. K., Baeza-Romero, M. T., and Heard, D. E.: Environ. Sci. Technol., 49, 4878-4885, 2015.
- Bielski, B. H. J., Cabelli, D. E., Arudi, R. L., and Ross, A. B., J. Phys. Chem. Ref. Data, 14, 1041-1100, 1985.