IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet oFOx32

This data sheet updated: 29th March 2005.

$$HO_2 + CH_2FO_2 \rightarrow O_2 + CH_2FO_2H \quad (1)$$
$$\rightarrow O_2 + HCOF + H_2O \quad (2)$$

Rate coefficient data ($k = k_1 + k_2$)

k/cm^3 molecule^{-1} s^{-1}	Temp./K	Reference	Technique/ Comments
Branching Ratios			
$k_1/k = 0.29 \pm 0.08$	295	Wallington et al., 1994	UVP-FTIR (a)
$k_2/k = 0.71 \pm 0.11$	295		

Comments

(a) HO_2 and CH_2FO_2 radicals were generated from the steady-state photolysis of Cl_2 in the presence of CH_3F-H_2-air mixtures at total pressures of 400-933 mbar. The branching ratios were derived from FTIR analysis of CH_2FO_2H and HCOF, which accounted for 100 ± 13% of the loss of CH_3F.

Preferred Values

$k_1/k = 0.3$ at 298 K.
$k_2/k = 0.7$ at 298 K.

Reliability

$\Delta(k_1/k) = \Delta(k_2/k) = \pm 0.1$ at 298 K.

Comments on Preferred Values

The lack of a pressure dependence of the branching ratio determined by Wallington et al. (1994) indicates that there is no thermal decomposition of the products. The observation of two reaction channels for this reaction is in accord with data for other HO_2 reactions with substituted peroxy radicals, for example, with $HOCH_2O_2$ and $CH_3OCH_2O_2$ radicals.

References

Wallington, T. J., Hurley, M. D., Schneider, W. F., Sehested, J. and Nielsen, O. J.: Chem. Phys. Lett. 218, 34, 1994.