IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iClOx13

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$ClCO + M \rightarrow Cl + CO + M$

$\Delta H° = 32.6$ kJ·mol^{-1}

Low-pressure rate coefficients
Rate coefficient data

k_0/s^{-1}	Temp./K	Reference	Technique/ Comments
Absolute Rate Coefficients 4.1 x 10^{-10} exp[-(2960 ± 160)/T] [N_2]	185-260	Nicovich, Kreutter, and Wine, 1990	PLP-RF (a)

Comments

(a) Pulsed laser photolysis of Cl_2-CO-M (M = N_2, CO, Ar and CO_2) mixtures at 355 nm. The pressure was 19-267 mbar. By second- and third-law analyses of the temperature dependence of the equilibrium constant, a value of $\Delta H°(298\ K) = (32.2 \pm 2.5)$ kJ mol^{-1} was derived. The relative collision efficiencies were $\beta_c(CO_2) : \beta_c(CO/N_2) : \beta_c(Ar) = 3.2 : 1.0 : 0.8$.

Preferred Values

$k_0 = 2.0 \times 10^{-14}$ [N_2] s^{-1} at 298 K.
$k_0 = 4.1 \times 10^{-10} \exp(-2960/T)$ [N_2] s^{-1} over the temperature range 180-300 K.

Reliability

$\Delta \log k_0 = \pm 0.4$ at 298 K.
$\Delta(E/R) = \pm 200$ K.

Comments on Preferred Values

The preferred rate coefficients are based on the study of Nicovich et al. (1990).

References

Nicovich, J. M., Kreutter, K. D. and Wine, P. H.: J. Chem. Phys., 92, 3539, 1990.