IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet iIOx20

 The citation for this data sheet is: Atkinson, R., Baulch, D. L., Cox, R. A., Crowley, J. N., Hampson, R. F., Hynes, R. G., Jenkin, M. E., Rossi, M. J., and Troe, J., Atmos. Chem. Phys., 7, 981-1191, 2007. / IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation, (http://iupac.pole-ether.fr).
This datasheet last evaluated: Sept 2018; last change in preferred values: Sept 2018

$IONO_2 + M \rightarrow IO + NO_2 + M$

Falloff range

No direct measurements are available.

Preferred Values

k(1bar of air) = 2.1 x 10^{15} exp (-13670/T) s^{-1} over the temperature range 240-300 K.
k(1 bar of air) = 3.4 × 10^{-5} s^{-1} at 298 K.

Reliability

$\Delta \log k = \pm 1$ at 300 K.
$\Delta E/R = \pm 500$ K.

Comments on Preferred Values

The expression was obtained by Kaltsoyannis and Plane (2008) by inverting an RRKM fit of rate coefficient measurements of the reverse reaction. Measurements of IO profiles at 473 K and 300 Torr indicated the presence of $IONO_2$ dissociation which is consistent with the proposed rate expression. This expression supercedes the earlier estimate of Allan and Plane (2002) who reported k(1bar of air) = 1.1 x 10^{15} exp (-12060/T) s^{-1}.

References

Allan, B. J. and Plane, J. M. C.: J. Phys. Chem. A, 106, 8634, 2002.
Kaltsoyannis, N., and Plane, J. M. C., Phys. Chem. Chem. Phys., 10, 1723-1733, 2008.