

IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet PC16

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This data sheet updated: 20th July 2006.

$\text{Cl}_2\text{O}_3 + h\nu \rightarrow \text{products}$

Primary photochemical processes

Reaction	$\Delta H^\circ/\text{kJ}\cdot\text{mol}^{-1}$	$\lambda_{\text{threshold}}/\text{nm}$
$\text{Cl}_2\text{O}_3 + h\nu \rightarrow \text{ClO} + \text{OCIO}$ (1)	44	2720
$\rightarrow \text{Cl} + \text{ClO}_3$ (2)	201	595

Preferred Values

Absorption cross-sections for Cl_2O_3 at 200-260 K

λ/nm	$10^{20} \sigma/\text{cm}^2$	λ/nm	$10^{20} \sigma/\text{cm}^2$
220	968	275	1376
225	930	280	1136
230	908	285	890
235	883	290	642
240	904	295	435
245	989	300	288
250	1154	305	176
255	1352	310	107
260	1512	315	56
265	1594	320	36
270	1544		

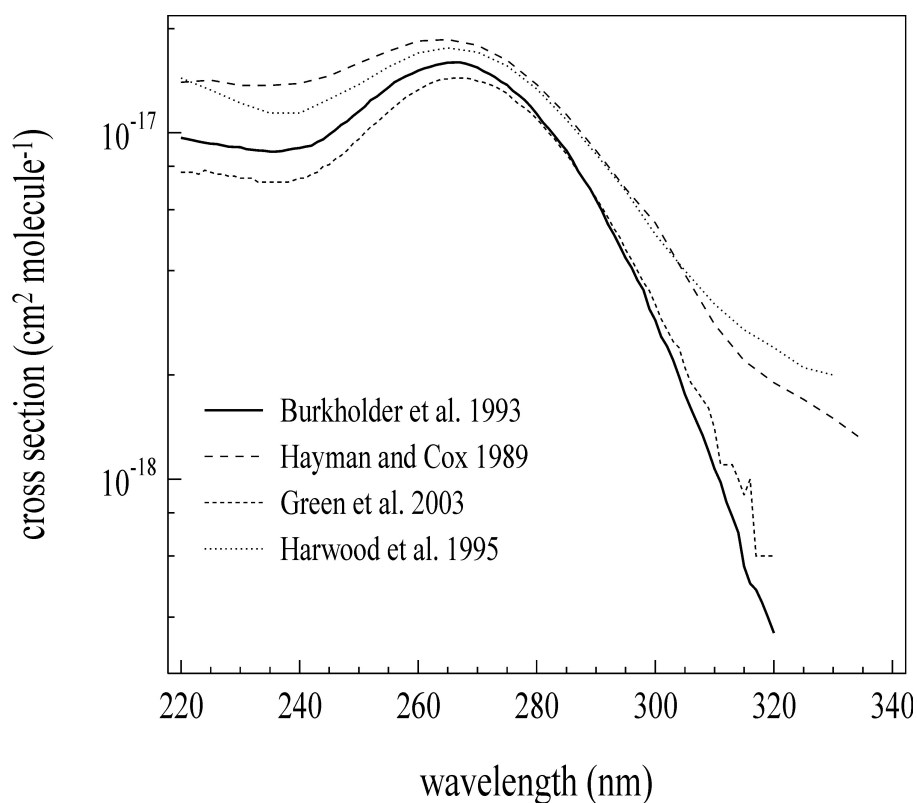
Comments on Preferred Values

The preferred values of the absorption cross sections are those reported by Burkholder et al. (1993). Green et al. (2003) report a spectrum that is similar in shape, with a value of σ_{max} which is $\approx 10\%$ lower. There is no dependence on temperature over the range 200-260 K. The cross sections of Hayman and Cox (1989) are approximately 20% larger than those of Burkholder et al. (1993) close to λ_{max} and a factor of three larger at 310 nm. A similar enhancement in cross section at $\lambda > 300$ nm was observed by Harwood et al. (1995). The cross sections at $\lambda > 290$ nm are thus associated with substantial uncertainty.

The mechanism and quantum yield for photodissociation have not been determined.

References

- Burkholder, J. B., Mauldin, R. L., Yokelson, R. J., Solomon, S., and Ravishankara, A. R.: *J. Phys. Chem.*, 97, 7597, 1993.
- Green, T. J., Islam, M., Guest, P., Hickson, K., Canosa-Mas, C. E., and Wayne, R. P.: *Phys. Chem. Chem. Phys.* 4, 5409, 2003.
- Harwood, M. H., Rowley, D. M., Freshwater, R. A., Cox, R. A., and Jones, R. L.: *J. Chem. Soc. Faraday Trans.*, 91, 3027, 1995.
- Hayman, G. D., and Cox, R. A.: *Chem. Phys. Lett.*, 155, 1, 1989.



Absorption spectra of Cl₂O₃: The solid line of Burkholder et al. (1993) represents the preferred spectrum.