

1 Electronic Supplementary Information

2 S1. Measurements of absorption cross-sections for H₂O₂

3 The procedure for the determination of $\sigma_{\text{H}_2\text{O}_2}$ follows that described by Kahan *et al.*¹
4 The values for $\sigma_{\text{H}_2\text{O}_2}$ from the recommendation of Sander *et al.*² were used for wavelengths
5 below 320 nm, and the values measured by Kahan *et al.*¹ were used for wavelengths above
6 350 nm. Values of $\sigma_{\text{H}_2\text{O}_2}$ between these wavelengths were determined from a cubic spline
7 interpolation between the values from the recommendation of Sander *et al.* from 310 to 320
8 nm and the values measured by Kahan *et al.*¹ from 353 to 410 nm. These values are
9 presented as Table S1. As shown in Figure S1, this treatment shows reasonable agreement
10 with the studies of Molina and Molina³ and Nicovich and Wine⁴. As discussed by Kahan *et*
11 *al.*¹, the recommendations of Sander *et al.*¹ may be biased high at wavelengths greater than
12 320 nm.

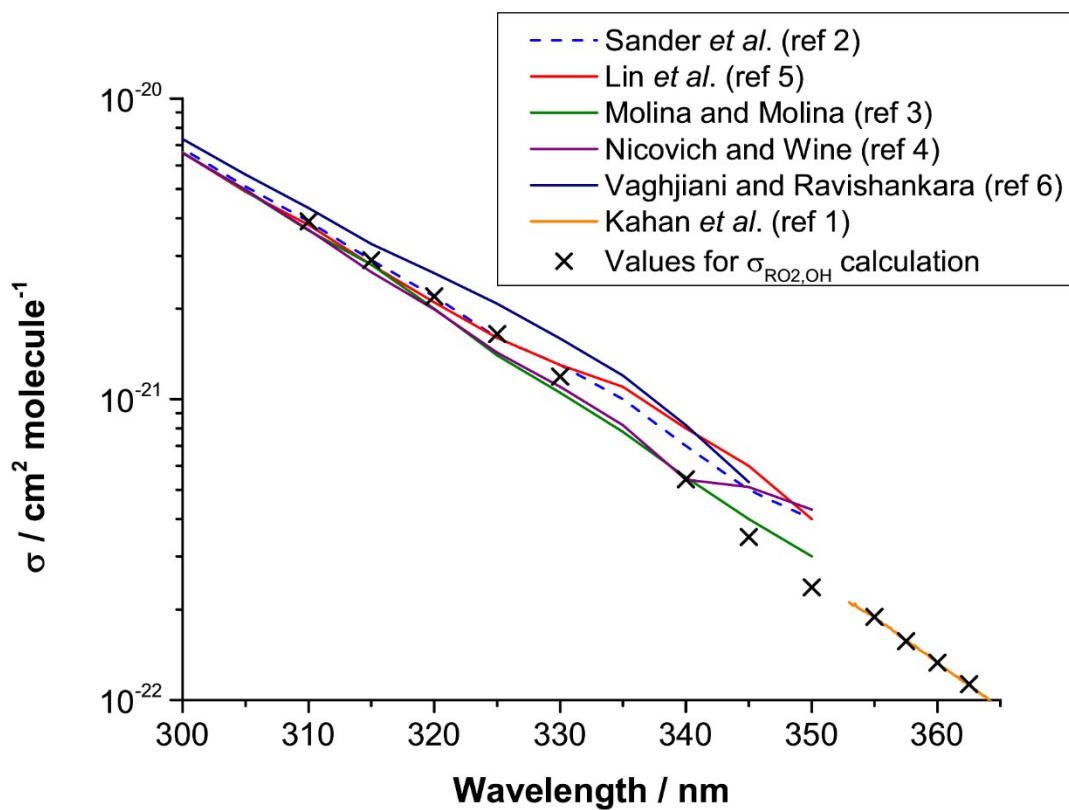
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14 Table S1. Total absorption cross-sections for H₂O₂ ($\sigma_{\text{H}_2\text{O}_2}$), to three significant figures,
15 determined according to the procedure in Section S1 and used in the calculations of $\sigma_{\text{RO}_2,\text{OH}}$
16 (see main text).

Wavelength (nm)	$\sigma_{\text{H}_2\text{O}_2}$ (10^{-22} cm ² molecule ⁻¹)
310	39.0
315	29.0
320	22.0
325	16.5
330	11.9
340	5.42
345	3.48
350	2.37
355	1.89
357.5	1.57
360	1.33
362.5	1.13

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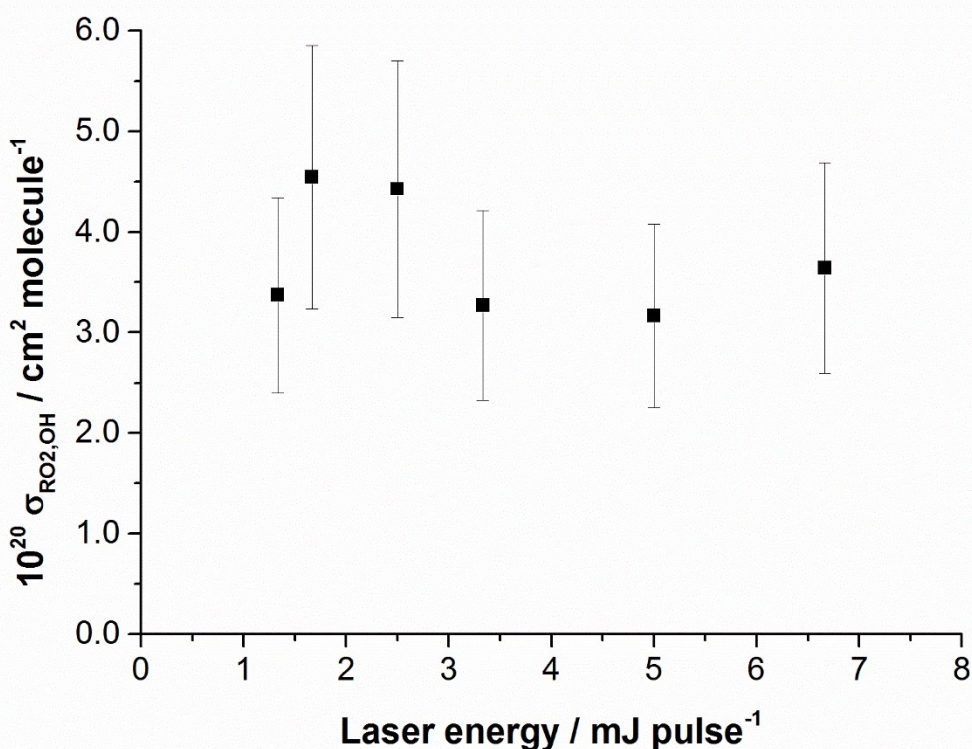
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20 Figure S1. Total absorption cross-sections for H_2O_2 from the literature¹⁻⁶ (lines) at
 21 wavelengths from 300 to 365 nm and the values (X) used for the calculation of $\sigma_{\text{RO}_2,\text{OH}}$,
 22 derived as described in section S1. Note the logarithmic scale on the y-axis.

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25 Figure S2. Variation of measurements of $\sigma_{\text{RO}_2,\text{OH}}$ for RO_2 derived from ethylene with
 26 photolysis laser energy at a photolysis wavelength of 350 nm. Error bars indicate the 1σ
 27 uncertainty on the values of $\sigma_{\text{RO}_2,\text{OH}}$ at this wavelength, as described in the main text.

28 References

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