

Interactive comment on “Near-UV photolysis cross sections of CH₃OOH and HOCH₂OOH determined via action spectroscopy” by C. M. Roehl et al.

C. M. Roehl et al.

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Response to the Comments made by Anonymous Referee #1

Comment 1) A sentence has been added to the text as suggested.

Comment 2) It is true that photolysis of the various peroxides may yield different vibrational state distributions and it was not measured in this work. We are not currently set-up to do such a measurement. However, as the Referee points out, the photolytic production of OH ($v'' > 0$) is expected to be small and hence it is assumed negligible here. This assumption is supported by the work of Ondrey G. et. al [1983] who reported an upper limit of 1% for the relative yield $[\text{OH}(v''=1)]/[\text{OH}(v''=0)]$ from single-photon 248 nm photolysis of H₂O₂. A sentence stating this assumption and the reference have been added to the text. The OH relaxation mentioned in the text refers to the excited

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OH molecules (in the A state, $v'=1$) generated by probe laser excitation. For pressures above a few torr of N₂, approximately 75% of excited OH molecules undergo vibrational energy transfer to the $v'=0$ [Wennberg et al., 1994].

Comment 3) The OH loss processes are sufficiently fast, such that all the OH is removed between one pump pulse and the next (frequency at 100 Hz). With no OH build-up and the probe pulse delay being so short (1 microsecond), our measurements are not sensitive to the loss processes.

Comment 4) We have removed this text altogether.

Comment 5) The error bars were inadvertently left off Figure 2a of the submitted version of the manuscript. This has been corrected in the figure and error values have been added to our data and to reference data (whenever available) in Tables 1 and 2. The MHP data does lie within the error limits of the Vaghjiani and Ravishankara data and a phrase stating this was added to the text. Since, Bauerle and Moortgat did not report their error, a similar comparison cannot be done with the HMHP data. For both HMHP and HMP, the calculations shown in Figure 4a and 4b are meant to be simply illustrative - the photolysis rates used in atmospheric modeling will be calculated from the measured or calculated actinic flux and the measured cross sections. This has been clarified in the text and we make a recommendation for the appropriate choice of cross sections.

Comment 6) We have no explanation for the increase in the H₂O₂/MHP cross section ratio at lower temperatures, though we know of no reason why the temperature dependence of the yields needs to be the same.

Technical comments and corrections: All corrections have been made as suggested.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 11597, 2006.