

Supporting Information: Different Chlorine and Hydroxyl Radical Environments Impact *m*-xylene Oxidation Products

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Modeled chamber spectra and potential model error

The blacklight spectrum used in the SAPRC model in this study is shown in Figure S1 alongside literature absorption cross sections¹ for radical precursors. Absorption spectra for ClNO₂ and H₂O₂ fall in the tail of the blacklight emissions spectrum and small differences in the spectra would substantially alter the anticipated photolysis rate.

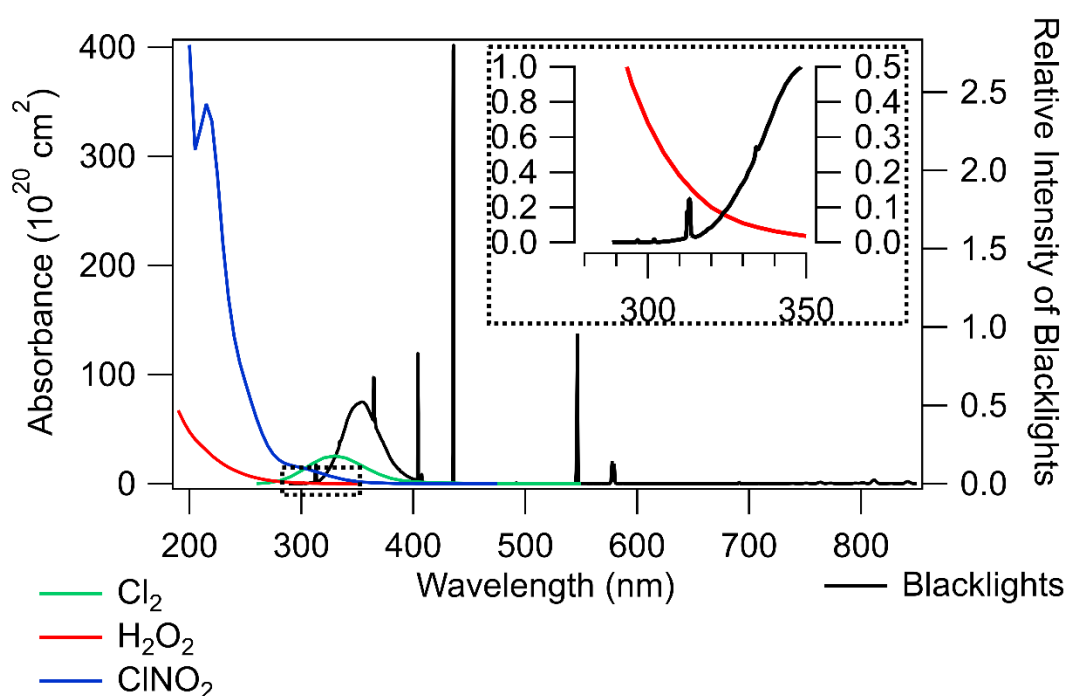


Figure S1: UV blacklight spectrum and relevant absorption cross sections. Inset shows small overlap between UV blacklight spectrum and H₂O₂ absorption cross section.

Experimental time series

Time series of radical precursors and key gas phase species are shown here for Experiments 3, 8, 9 and 10 in Figures S2-5.

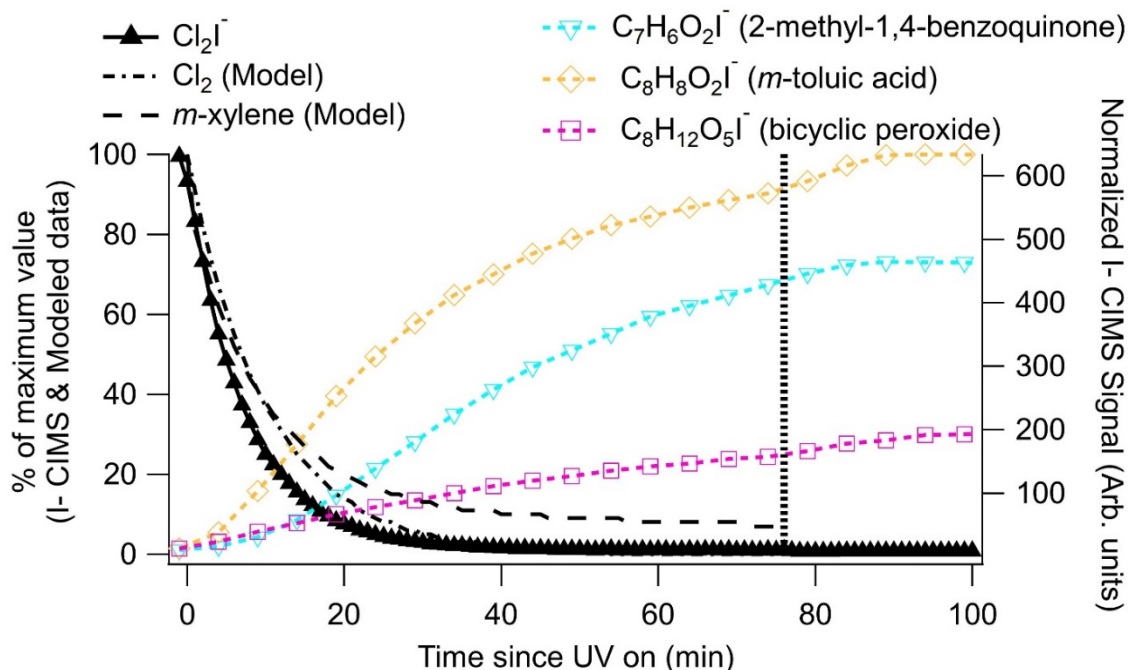


Figure S2: Experiment 3 ($\text{Cl}_2 + \text{NO}$) precursor consumption and selected product formation. Dashed vertical line indicates end of illumination period.

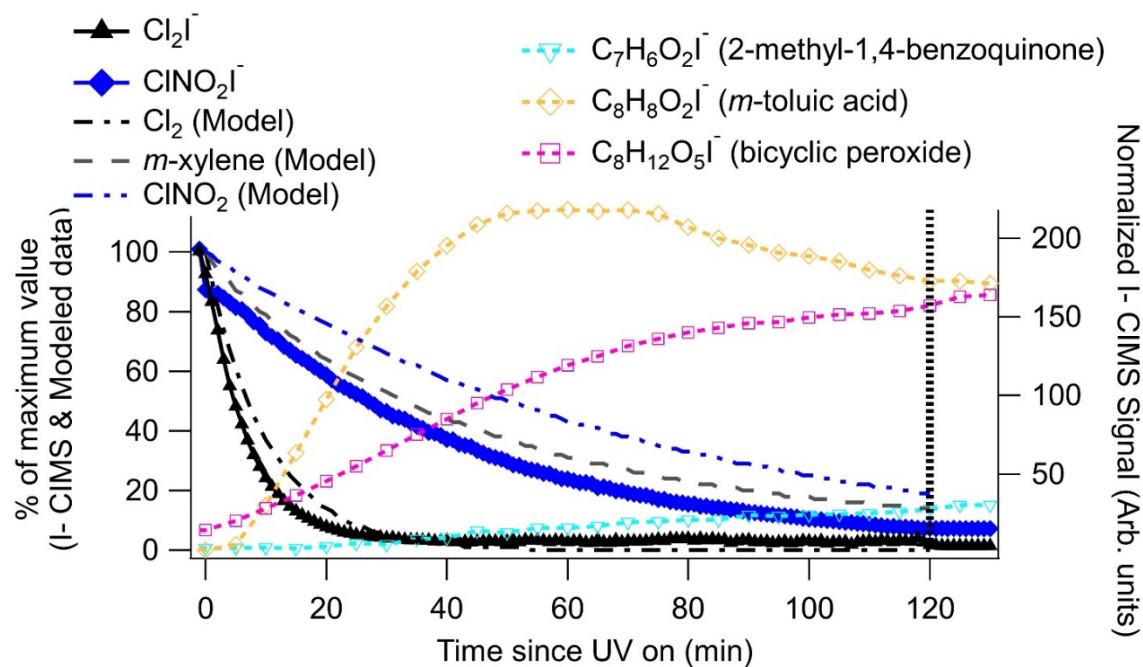


Figure S3: Experiment 8 ($\text{Cl}_2 + \text{ClNO}_2$) precursor consumption and selected product formation. Dashed vertical line indicates end of illumination period.

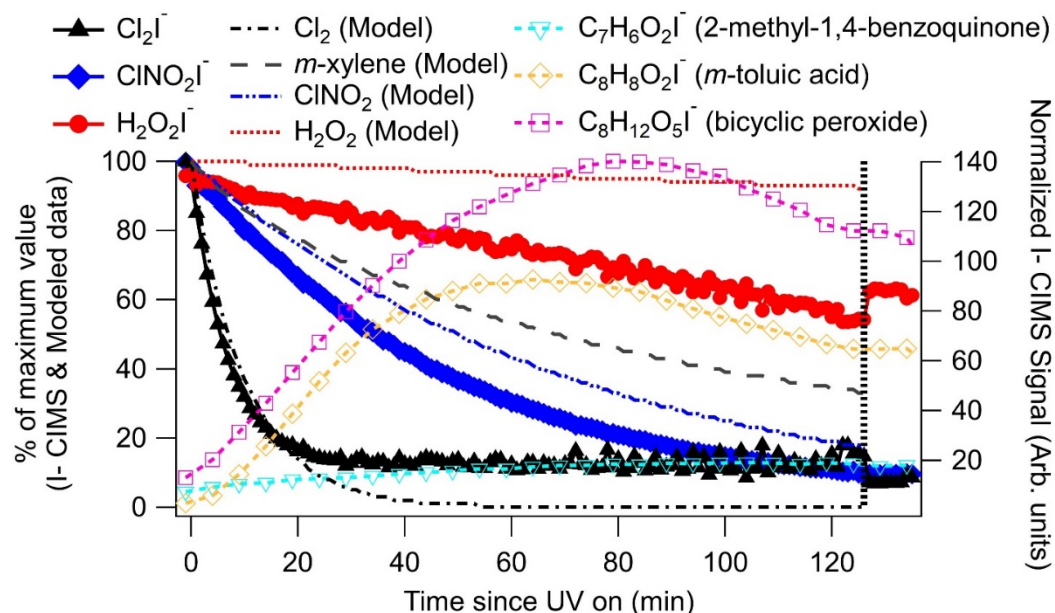


Figure S4: Experiment 10 (Cl₂ + ClNO₂ + H₂O₂) precursor consumption and selected product formation. Dashed vertical line indicates end of illumination period.

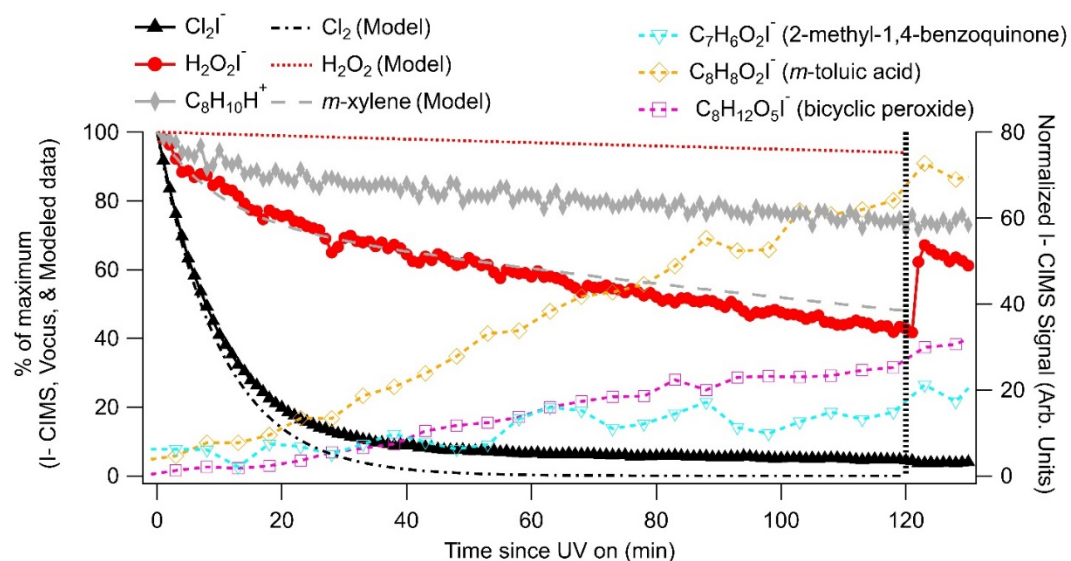


Figure S5: Experiment 9 (Cl₂ + H₂O₂) precursor consumption and selected product formation. Dashed vertical line indicates end of illumination period.

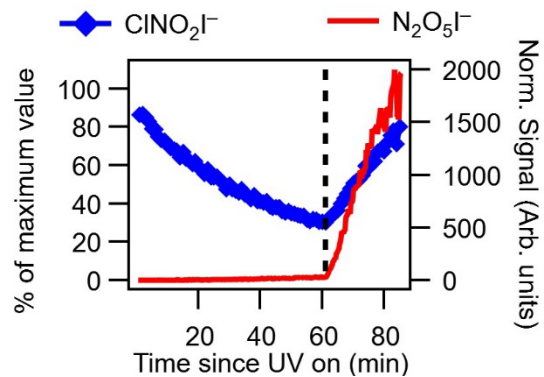


Figure S6: Experiment 1 (ClONO_2) consumption of ClONO_2 and nocturnal formation of ClONO_2 and N_2O_5

Modeled and measured m-xylene consumption

Chamber modeling and measured decay of *m*-xylene normalized to maximum concentration.

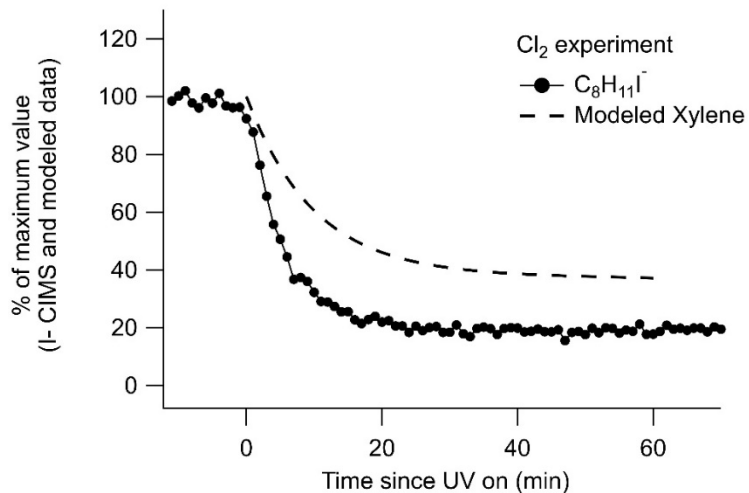


Figure S7: Experiment 4 consumption of *m*-xylene and chamber modeled consumption.

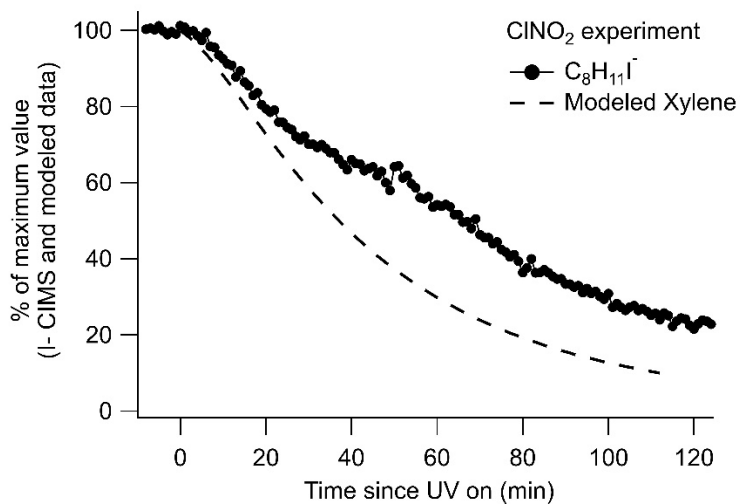


Figure S8: Experiment 2 consumption of m-xylene and chamber modeled consumption.

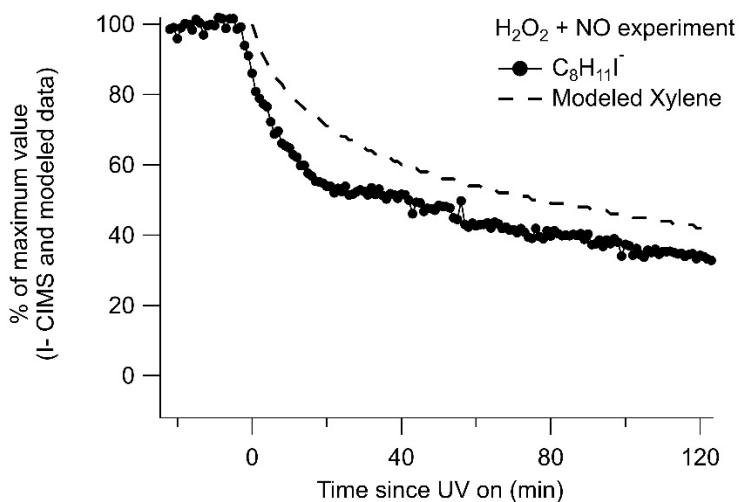


Figure S9: Experiment 6 consumption of m-xylene and chamber modeled consumption

Modeled oxidant exposures

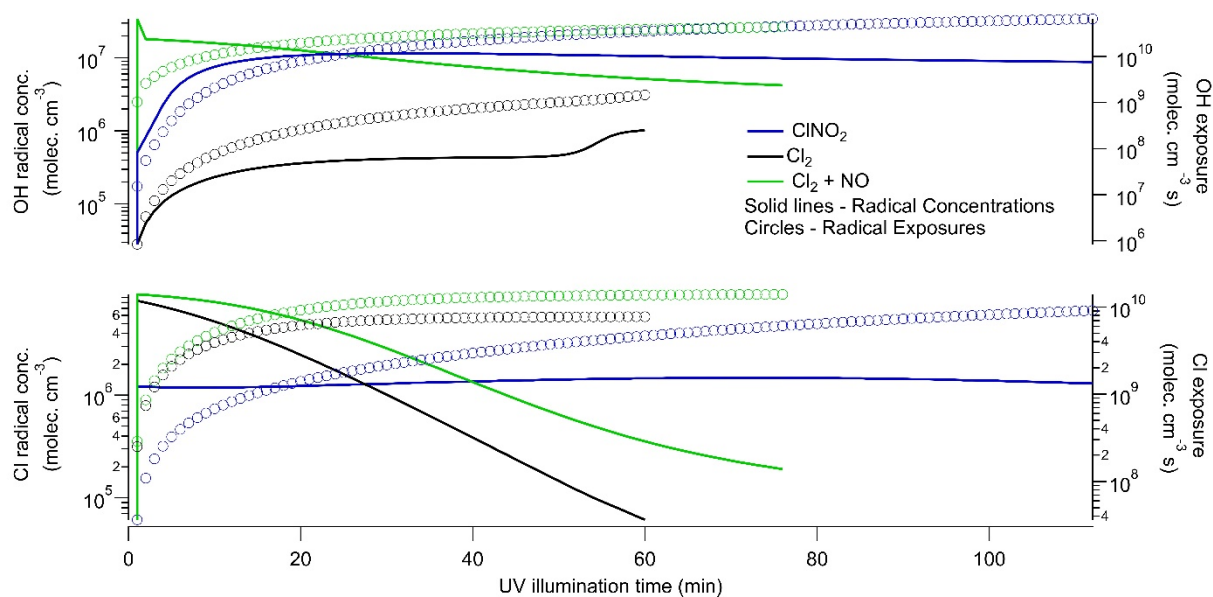


Figure S10: Modeled Cl and OH exposures for Cl radical precursor experiments.

References

- 1 S. P. Sander, R. R. Friedl, D. M. Golden, M. J. Kurylo, G. K. Moortgat, P. H. Wine, a R. Ravishankara, C. E. Kolb, M. J. Molina, S. Diego, L. Jolla, R. E. Huie and V. L. Orkin, Chemical Kinetics and Photochemical Data for Use in Atmospheric Studies Evaluation Number 15, *Cross Sect.*, 2006, **California**, 1–153.