

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Time-Resolved Mid-Infrared Frequency Comb Spectroscopy of Transient Radical Species THINH BUI, California Institute of Technology, ADAM FLEISHER, National Institute of Standards and Technology, Gaithersburg, MD 20899, USA., BRYCE BJORK, KEVIN COSSEL, JUN YE, JILA, National Institute of Standards and Technology and University of Colorado, Department of Physics, Boulder, CO 80309, USA., MICHIO OKUMURA, California Institute of Technology, JILA COLLABORATION, CALIFORNIA INSTITUTE OF TECHNOLOGY COLLABORATION — Understanding chemical reactions require unambiguous determinations of reactant, intermediate, and product concentrations on time scales faster than the reaction rate. For high detection sensitivities, direct absorption spectroscopy in the mid-infrared can often be desirable due to strongly absorbing fundamental molecular vibrations. Here, we demonstrate time-resolved frequency comb spectroscopy (TRFCS), a mid-infrared broadband technique for the study of chemical reactions on the μs timescale, to measure an important transient free radicals species, hydroxyformyl radical trans-DOCO. Directly after photolysis of the chemical precursor acrylic acid- d_1 , we measure absolute trans-DOCO product concentrations as well as its subsequent loss with a time resolution of $25 \mu\text{s}$. In addition to trans-DOCO product formation, we observed unexpected C-H bond fission channels in photoexcited acrylic acid.

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Date submitted: 30 Jan 2014

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