

Abstract Submitted
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Using femtosecond laser pulses to explore the catalytic processing of biomass molecules NANCY FUJIKADO, SCOTT SAYRES, Arizona State University — Hydrothermal liquefaction (HTL) is an emerging process for converting biomass into a renewable fuel source. While the composition of biomass may be complex, our focus is to gain a molecular level understanding of the breakdown of carbohydrates, which have been identified as a main component. I will present recent progress on the design and construction of a time-of-flight mass spectrometer that is used to explore chemical reactions important to biomass conversion. In this experimental setup, a femtosecond laser pulse removes electrons faster than the molecule can respond, and therefore is used to identify the parent molecule. By increasing the laser intensity, the target molecule is destroyed and the relative peak ratios between the generated fragmentation products reveals details about the chemical structure and breakdown mechanisms. By exposing the carbohydrate to different molecular catalysts, the mass spectra peak ratios are modified and therefore suggest reaction conditions to improve biomass to biofuel conversion efficiency.

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