

Abstract Submitted
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Simultaneous high-speed schlieren and OH chemiluminescence imaging in a hybrid rocket combustor at elevated pressures VICTOR MILLER, ELIZABETH T. JENS, FLORA S. MECHENTEL, BRIAN J. CANTWELL, Stanford University, STANFORD PROPULSION AND SPACE EXPLORATION GROUP TEAM — In this work, we present observations of the overall features and dynamics of flow and combustion in a slab-type hybrid rocket combustor. Tests were conducted in the recently upgraded Stanford Combustion Visualization Facility, a hybrid rocket combustor test platform capable of generating constant mass-flux flows of oxygen. High-speed (3 kHz) schlieren and OH chemiluminescence imaging were used to visualize the flow. We present imaging results for the combustion of two different fuel grains, a classic, low regression rate polymethyl methacrylate (PMMA), and a high regression rate paraffin, and all tests were conducted in gaseous oxygen. Each fuel grain was tested at multiple free-stream pressures at constant oxidizer mass flux ($40 \text{ kg/m}^2\text{s}$). The resulting image sequences suggest that aspects of the dynamics and scaling of the system depend strongly on both pressure and type of fuel.

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