Abstract Submitted
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Combustion of Condensed Phase Alternative Fuels in an Acoustic Field[1] JUAN RODRIGUEZ, HANN-SHIN MAO, SOPHONIAS TESHOME, ALEC PEZESHKIAN, OWEN SMITH, ANN KARAGOZIAN, UCLA — This experimental study focused on fuel droplet combustion characteristics for various liquids during exposure to external acoustical perturbations. Emphasis in the present study was placed on the combustion of a number of alternative liquid fuels, including ethanol, methanol, aviation fuels, and blends of aviation fuel and liquid synthetic fuel derived from coal gasification via the Fischer-Tropsch process. The study examined combustion during excitation conditions in which the droplet was situated at or near a velocity antinode (pressure node) and at or near a velocity node (pressure antinode). During acoustic excitation of burning droplets, flame orientation was consistent with the sign of the acoustic radiation force acting on the burning system, creating conditions where the flame deflection switched, depending on the relative location of the droplet. Differences in burning rates, the degree and orientation of flame deflection, and flame extinction mechanisms were identified for the range of fuels and acoustic excitation conditions.

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