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Effect of Equivalence Ratio and G-Loading on In-Situ Measurements of Chemiluminescence in An Ultra Compact Combustor

By Jason M. Armstrong

Biblioscholar Nov 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x7 mm. This item is printed on demand - Print on Demand Neuware - Using a spectrometer and high temperature fiber optics the relative intensities of the near-infrared, visible and ultraviolet radiation emitted from the C_2^* , CH^* , and OH^* radicals were measured at eight discrete locations within the Ultra Compact Combustor test rig. Blackbody radiation in the near infrared was also observed. The tests were conducted at various g-loadings and overall equivalence ratios and with various air hole configurations. These measurements were compared to determine the effect of these changes on the radiation emitted. Local C_2^* intensities were used to estimate the flame location within the combustor and the local CH^*/OH^* ratio was used as a gauge of the local equivalence ratio within the cavity. Results indicate the highest ratios of CH^*/OH^* occur in the outer radius of the cavity where the high g-loads transport the colder unreacted fuel and air. The highest C_2^* ratios also occur in the outer radius. A correlation between cavity equivalence ratio and C_2^*/OH^* was determined for these experiments as well. Fuel droplet size characterization was also conducted using a laser diffraction particle size analyzer. The...



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