Abstract Submitted
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Measurement of OH radical density in DBD-enhanced premixed burner flame by laser-induced fluorescence KAZUNORI ZAIMA, KOICHI SASAKI, Hokkaido Univ. — We examined OH density in DBD-enhanced premixed burner flame by laser-induced fluorescence (LIF). We ignited a premixed flame with $CH_4/O_2/Ar$ mixture using a burner which worked as the ground electrode. The upper part of the flame was covered with a quartz tube, and we attached an aluminum electrode on the outside of the quartz tube. DBD inside the quartz tube was obtained between the aluminum electrode and the burner nozzle. The planar beam from a pulsed tunable laser excited OH in $X^2\Pi(v" = 0)$ to $A^2\Sigma^+(v' = 0)$, and we captured two-dimensional distribution of the LIF intensity using an ICCD camera. We employed three pump lines of Q_1(J=4, 8 and 10), and the rotational temperature of OH(X) was deduced from the ratio of the LIF intensities. The total density of OH was obtained from the LIF intensities and the rotational temperature. A principal experimental result was that no remarkable increase was observed in the OH density by the superposition of DBD. The correlation between the pulsed discharge current and the temporal variation of the OH density was not clear, suggesting that the oscillation of the OH density with a small amplitude is related to the transittion time constant between equilibrium and nonequilibrium combustion chemistries.

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