

Abstract Submitted
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Effective species in ignition processes of premixed burner flame with superposition of dielectric barrier discharge K. SASAKI, Y. DEGUCHI, Hokkaido University — We have identified the most effective species in the plasma-assisted ignition of a premixed burner flame by comparing the propagation speed of the flame kernel with the densities of radicals. The candidate radicals were OH and atomic oxygen. The spatial distributions of densities of OH and atomic oxygen were measured by (two-photon absorption) laser-induced fluorescence spectroscopy. The propagation speed of the flame kernel was measured by shadowgraph imaging. It was observed that the flame kernel in the bottom part, which was located at a closer distance from the exit of the afterglow gas from a dielectric barrier discharge, had a higher propagation speed than the top part. The spatial distribution of the OH density was gentle, and we did not find significant difference in the OH density at the bottom and top parts of the flame kernel. On the other hand, the density of atomic oxygen had a steeper distribution, and the density at the top part of the flame kernel was much lower than that at the bottom. On the basis of these experimental results, we have concluded that atomic oxygen is more effective than OH radical in the ignition of the premixed burner flame.

Koichi Sasaki
Hokkaido University

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