

Abstract Submitted
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Measurement of OH radical density in dielectric barrier discharge enhanced premixed burner flame KAZUNORI ZAIMA, KOICHI SASAKI, Hokkaido University — In this work, we examined temporal variation of OH radical density in a premixed burner flame assisted by dielectric barrier discharge (DBD) using cavity-ringdown absorption spectroscopy. We attached a premixed burner to a dielectric base plate, and the upper part of the premixed burner flame with CH₄/O₂/Ar gas mixture was covered with a quartz tube. An aluminum electrode was attached on the outside of the quartz tube, and it was connected to a high-voltage power supply. DBD inside the quartz tube was obtained between the aluminum electrode and the electrically-grounded burner nozzle. To measure the temporal variation of OH radical density, we constructed a system of cavity-ringdown absorption spectroscopy using a cw diode laser. We obtained the absorbance of OH radicals with and without DBD by comparing the ringdown signals observed at an absorption wavelength of OH radicals (6900.690 cm⁻¹) and an off-tuned wavelength (6900.900 cm⁻¹). As a result, it was observed that the density of OH radicals in the presence of DBD was lower than that in the absence of DBD at almost all the discharge phases. It is suggested from the result that the consumption of OH radicals is enhanced due to the change in combustion reactions in the flame in the presence of DBD.

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