

TWO COLOR FORMALDEHYDE PLIF THERMOMETRY USING A BURST MODE LASER

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Two color planar laser induced fluorescence (PLIF) is a robust combustion diagnostics technique to flame temperature field. Widely used OH-PLIF can measure the high temperature post flame front zone, but cannot accurately measure the intermediate temperature pre-flame front region where OH radical concentration is low. Here, the rotational resolved absorption cross section of formaldehyde in this region was analyzed and two peaks at 28183.5 cm^{-1} and 28184.5 cm^{-1} were selected as the line pair to determine flame temperature. The wavelength region can be easily accessed using the 3rd harmonics of Nd:YAG lasers at 355 nm. We demonstrate 20 kHz two dimensional flame temperature field measurement of a laminar coflow diffusion flame, a free jet flame and a reacting jet in hot crossflow using a wavelength-switching injection seeding burst mode laser and a single high speed camera.

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