

Abstract Submitted
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Simultaneous measurement of temperature and velocity of air flow over 1000C using two color phosphor thermometry MASATOSHI FUKUTA, SATOSHI SOMEYA, TETSUO MUNAKATA, AIST, LCS TEAM — Thermal barrier coatings were applied to the gas turbines and the internal combustion engines for the high thermal efficiency. The evaluation and the improvement of coatings require to measure transient gaseous flow near the wall with coatings. An aim of this study is to combine a two color phosphor thermometry with the PIV to measure simultaneously temperature and velocity of the gas over 1000C. The temperature and velocity distribution of an impinging jet of high temperature air was simultaneously visualized in experiments. The temperature was estimated from an intensity ratio of luminescent in different ranges of wavelength, 500 ~600 nm and 400 ~480 nm. Uncertainty of measured temperature was less than 10C. Temperatures measured by the developed method and by thermocouples were agreed well. The measured velocity by the PIV with phosphor particles were also agreed well with the velocity measured by a Laser Doppler Velocimeter.

Masatoshi Fukuta
AIST

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