

## Temperature Measurements Using Multicolor Pyrometry in Thermal Radiation Heating Environments

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Accurate temperature measurements are needed for thermal-structural stress analyses in thermal radiation environments. This paper describes the use of multicolor pyrometry for the measurements of diffuse surfaces in thermal radiation environments that eliminates the effects of background radiation reflections and unknown emissivities based on a least-squares algorithm. A multicolor pyrometer with a near-infrared spectral response of (1100 nm ~ 2400 nm) was used for the measurements after the calibrations of the wavelength, nonlinear intensity and spectral response curves. The temperature of a graphite sample irradiated by quartz lamps was then measured during heating and cooling using the least-squares algorithm based on the calibrated irradiation data. The experiments show that higher temperatures and longer wavelengths are more suitable for the thermal measurements in the quartz lamp radiation heating system. This analysis provides a valuable method for temperature measurements of diffuse surfaces in thermal radiation environments.