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# Development of nanosecond radiation thermometry for pulsed UV laser processing

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Irradiation with pulsed UV lasers is an attractive tool for the synthesis and modification of functional oxide thin films.[1] Especially it has a great possibility to reduce processing temperature, enabling the use of plastic or glass substrates which is suitable for coming printable and flexible electronics. However, in order to minimize the damage to the substrate, quantitative understanding of temperature fields during laser irradiation is required. Therefore, we have developed an *in situ* temperature monitoring system with near-infrared sensors.[2-4] On the basis of Planck's blackbody radiance spectral distribution law, the temperature was derived from the thermal emission signals collected with the sensors. A calibration was conducted by assuming that the observed plateau was equal to the melting point of ITO. The developed technique was useful for monitoring excimer laser processing. Fig. 1 shows the measured surface temperature history of $La_{0.8}Ba_{0.2}MnO_3$ amorphous thin films under a XeCl excimer laser irradiation at a fluence $F$ = 234 mJ/cm$^2$. The maximum surface temperature tended to decrease with the number of pulses except the first pulse, suggesting that a progression of crystallization from amorphouse phase upon laser irradiation was captured by this system. Further interpretation of the data required generalization of temperature calibration method, which will be discussed at the presentation.

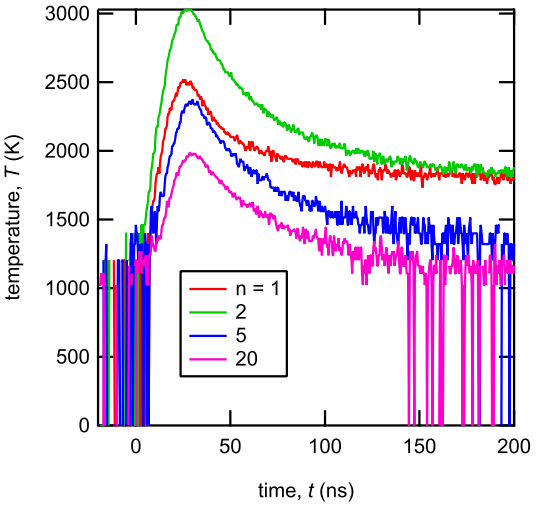


**Fig. 1: Time ($t$)-dependent temperature ($T$) profile of $La_{0.8}Ba_{0.2}MnO_3$ thin films at $n^{th}$ shots of pulsed UV laser.**

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