Thickness Effect on the Critical Current Density of $GdBa_2Cu_3O_7$ Thin Films Obtained by Pulsed Laser Deposition

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The *c*-axis oriented $GdBa_2Cu_3O_{7-x}$ (GdBCO) thin films with high critical temperature (T_C) and critical current density (J_C) were fabricated by pulsed laser deposition (PLD) using Nd:YAG laser (355 nm) with pulse energy density of 2.5 J/cm^2. High quality GdBCO films, with *Tc* over 90 K and *Jc* over 1.0 MA/cm^2 at 77 K in self-field, were successfully grown on the $SrTiO_3$ (100) substrate. During the deposition, the substrate temperature was 800℃, the oxygen pressure was 800mTorr, and the target-to-substrate distance was 6.0 cm. Effect of GdBCO film thickness in the range of 0.2 ㎛-2 ㎛ on the critical current in the liquid nitrogen was investigated. Interestingly, unlike typical behavior of PLD-processed YBCO films, the degradation of J_c with increasing film thickness was greatly suppressed, implying that GdBCO is a good alternative to YBCO for coated conductors. Field dependency of *Jc* is also presented for the study of flux pinning characteristics. This work was supported by a grant from Center for Applied Superconductivity Technology of the 21st Century Frontier R&D Program funded by the Ministry of Science and Technology, Republic of Korea.

Keywords : pulsed laser deposition, critical temperature (Tc), critical current density (Jc), flux pinning