

TmBa₂Cu₃O_{7-δ} Superconducting Thin Films Grown by Pulsed Laser Deposition Method

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ReBCO superconductors with Re ions of smaller size are known to be more easily obtained without cation deficiency and with a high oxygen content. Bulk ReBCO superconductor with Re = Tm which has ionic radius smaller than most other elements of the series, has shown T_c of up to 91K. It has been found to melt at a temperature about 20 degree lower than YBCO and has been studied for using as a filler material in the joint of bulk YBCO. The thin film result of TmBCO, however, has not been reported to the best of our knowledge. In order to investigate the possibility of using TmBCO as the superconducting layer of the HTS coated conductor, the TmBCO thin film was deposited on single crystal substrate using pulsed laser deposition.

Systematic studies on the influences of pulsed laser deposition parameters (deposition temperature, deposition pressure, processing gas, laser energy density, etc.) on microstructure, texture and superconducting properties of TmBCO films deposited on STO crystal substrates, were carried out. These results will be presented together with the discussion on the possible use of this material in HTS coated conductor.

Keywords : TmBCO, superconductor, thin film, pulsed laser deposition, coated conductor