

The Effect of Doped CeO₂ on Critical Properties of YBCO Film on Single Crystal using MOCVD Method

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To increase the critical current density (J_c) of Y₁Ba₂Cu₃O_{7- δ} (YBCO) film, deposition method, various studies on fabrication of mother substrate, buffer layer and dopants have been investigated. Recently, flux pinning effects by various dopants such as BaZrO₃ (BZO), CaZrO₃ (CZO) have been investigated. In this work, we investigated the pinning effect of BaCeO₃ (BCO) on the J_c of YBCO film. CeO₂-doped YBCO film was fabricated on MgO and SrTiO₃ single crystal substrates by metal organic chemical vapor deposition (MOCVD) method. The mole ratio of metal organic (MO) source was Y(tmhd)₃ : Ba(tmhd)₂ : Cu(tmhd)₂ = 1 : 2.1 : 2.9, and the YBCO film was prepared at deposition temperatures of 700 ~ 900 °C. Various amounts of CeO₂ were added to the MO source. The texture analysis and microstructural analysis of the cerium doped YBCO films were performed by x-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. Superconducting properties of the CeO₂ doped YBCO films were measured and compared to undoped YBCO sample.

Keywords : CeO₂, YBCO, MOCVD, MgO, STO, BaCeO₃

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