

Fabrication and Characterization of YBCO Thin Films Prepared by the MOD-TFA Process

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YBCO thin films were prepared on LaAlO₃(100) single-crystal substrates using the metalorganic deposition of trifluoroacetate precursors (MOD-TFA). TFA-based precursor solutions of YBCO were coated on the substrates by the spin coating method. As-coated films were dried in an oven, fired first at relatively low temperatures up to 400°C for 24 h in a humid O₂, fired again at the temperature region of 700~825°C for 2 h in a low partial pressure of H₂O and O₂, and finally oxygenated at 400°C for 1 h. Unlike previous report [1], it was confirmed that the films were consisted of Y₂O₃, BaF₂, and CuO after the first heat treatment. DTA-TG analyses for precursor films exhibited a large weight loss, related to several exothermic reactions, at the temperature region of 240~300°C. The maximum T_c value of 91K was obtained at annealing temperatures of 750~800°C. The largest J_c of 0.94 MA/cm² was obtained from a single-coated YBCO film on LaAlO₃(100) annealed at 775°C for 2h.

[1] J. A. Smith, M. J. Cima and N. Sonnenberg. "High Critical Current Density Thick MOD-Derived YBCO Films", IEEE Trans. Appl. Supercond., vol 9, p. 1531 (1999)

keywords : YBCO thin films, MOD-TFA, critical current density

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