

Effect of Excess Yttrium Additions on YBCO Thin Films Prepared by TFA-MOD Process

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YBa₂Cu₃O_{7-x} thin films were fabricated on LaAlO₃(100) substrate by TFA-MOD process via excess yttrium(0, 2.5, 5, 10, 15, 20 a/o) additions. Coating solution was prepared by adding extra amount of yttrium atoms into a stoichiometric(Y:Ba:Cu=1:2:3) TFA precursor solution. Results are presented concerning the influence of excess yttrium additions on the microstructure development and superconducting properties of YBa₂Cu₃O_{7-x} film. X-ray diffraction data showed that the Y₂O₃ was presented as a second phase when extra yttrium was added to the coating solution. The addition of excess yttrium affected little on T_c of YBa₂Cu₃O_{7-x} film. J_c of YBCO film was enhanced with excess yttrium addition. J_c was increased with the addition of excess yttrium upto 15 a/o and maximum J_c of 2.25 MA/cm² at 77 K, self field was obtained. With further yttrium addition to 20 a/o, the decrease of J_c was observed. The entrapment mechanism of second phase particles in Y123 grains during the growth of Y123 grains is suggested.

keywords : excess yttrium, TFA-MOD, J_c, YBCO, flux pinning

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