Effects of Precursor Composition on the J_c of YBCO Thin Films Prepared by DCA-MOD Method

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$YBa_2Cu_3O_{7-\delta}$ films have been prepared on $LaAlO_3$ (100) single-crystal substrates by the metal organic deposition using dichloroacetate precursors (DCA-MOD). Yttrium-excess(15 at%), barium-poor(0.5 at%), and a stoichiometric(Y:Ba:Cu=1:2:3) DCA precursor solutions were prepared in order to investigate the effects of precursor composition in YBCO films prepared by DCA-MOD method. Coated films were calcined at low temperature up to 500℃ in flowing humid oxygen atmosphere. Conversion heat treatment was performed 800℃ for 2 h in flowing Ar gas containing 1000 ppm oxygen with a humidity of 9.45%. For the film prepared using excess yttrium composition, high critical current density (J_c) of >2MA/cm^2 was obtained whereas, for the films prepared using barium-poor composition, J_c was lower than 1MA/cm^2.

Keywords: thin film, YBCO, DCA-MOD, Yttrium-excess, barium-poor

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