

The Properties of GdBCO Films Prepared by DCA-MOD Technique ; The Effects of Solvent

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High J_c GdBa₂Cu₃O_x superconducting films were fabricated by MOD method using fluorine-free dichloroacetic acid(DCA) as solvent for preparing precursor solution. Coating solutions were prepared by dissolving Y-, Ba- and Cu-DCA metal-organics in methanol(M-OH), ethylene glycol(EG) and (DMF). Dichloroacetate precursors solution was coated on single crystal (001) LaAlO₃(LAO) substrate by dip coating method with a speed of 20 mm/min. Coated film was calcined at lower temperature up to 500°C in oxygen atmosphere with a 12.2% humidity. Conversion heat treatment was performed at various temperatures of 765~785°C for 2 h in flowing Ar gas containing 1000 ppm oxygen partial pressure with a humidity of 12.2%. SEM observations showed that films have porous microstructures when Methanol and EG were used as solvents whereas a relatively dense film was obtained for DMF solvent. X-ray diffraction analysis showed that the GdBCO films have a good bi-axial texture. Films showed a high critical transition temperature(T_c) of 90 K and a high critical transport current density (J_c) of > 0.5 MA/cm² (77 K and self-field).

Keywords : dichloroacetic acid(DCA), MOD, GdBCO, J_c

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