Dip-coated YBCO Films by the Metal-organic Deposition (MOD) Method Using Trifluoroacetates

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Recently, YBCO-HTS research have been focused on development of thin film coated conductors. PLD and/or MOCVD is one of the most reliable processes for the fabrication of high-qualified YBCO thin films with high J_c. Metal-organic deposition (MOD) using trifluoroacetates (TFA) is one of the attracting and promising growth techniques for $YBa_2Cu_3O_7$ (YBCO) films because of its potential for scale-up and a low cost non-vacuum processes.

We succeeded in the development of a high-quality precursor solution and investigated processing conditions; 1_{st} and 2_{nd} heat-treated temperature, time and atmosphere and other coating processing conditions. The dip coated YBCO thin film on single crystal $LaAlO_3$ (LAO) substrates were treated in the two stage thermal process under wet oxygen below 400 ℃ for 23 hrs and subsequently heated up to 815 ℃ in a wet argon-oxygen atmosphere. The film phase and morphology were confirmed by both XRD and SEM-ED. The optimum heat-treated temperature was found to be near 800 ℃ in a wet Ar with 1000 ppm oxygen atmosphere. The net-worked grown YBCO thin film on LAO showed a superconducting transition (T_c) at 90 K. The results of this study define YBCO thin film formation conditions for TFA-based precursor that may be suitable for application on Ni-alloy substrates.

Keywords: YBCO, MOD, Trifluoroacetate, Dip coating

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