

Preparation of REBCO films by Metal Organic Deposition Process using REBCO TFA precursor solutions

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There have been many approaches for fabricating high J_c YBCO coated conductors. Vacuum processes such as pulsed laser deposition(PLD), e-beam co-evaporation, sputtering, and metal organic chemical vapor deposition(MOCVD) have been proved effective for producing high J_c films. Considering long-length conductor application, however, vacuum processes may be untenable from an economical perspective. From this viewpoint, nonvacuum ex-situ processes such as metal organic deposition(MOD) and sol-gel processing based on solution techniques offer promising alternatives. Reported values of the critical current density for YBCO films prepared by solution processes are comparable to those of YBCO films by vacuum processes. The MOD process using trifluoroacetate (TFA) resulted in some of the highest J_c values among them. However, its application to metal substrate has still not been fully demonstrated due to the lack of understanding of the processing conditions. Further, unlike YBCO, TFA-MOD REBCO films have rarely been reported. In the present study, we thus investigated the fabrication conditions of TFA-MOD SmBCO films on SrTiO₃ (100) substrates, referring to the processing parameters suitable for the fabrication of TFA-MOD YBCO films on LaAlO₃ (001) substrates.

keywords : coated conductor, TFA process, ReBCO oxide, oxide superconductor