

## The Effect of Multi-coating on Critical Properties of YBCO Films Prepared by TFA-MOD

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We fabricated YBCO films on (001) LaAlO<sub>3</sub> single crystal prepared by metal organic deposition (MOD) method with multi-coating and evaluated the influences of film thickness and heat treatment conditions on phase formation, texture, and critical properties by microstructural observations. For the observation of microstructure of multi-coated YBCO films, a scanning electron microscopy (SEM, XL-30 ESEM, FEG) and high resolution transmission electron microscopy (HRTEM, JEOL-JEM2100F) with EDS system were used and the regional phase formation and texture were characterized from X-ray diffraction and pole-figure.

The microstructure and resultant critical current ( $I_C$ ) and critical current density ( $J_C$ ) varied remarkably with film thickness: The  $I_C$  value increased from 39 to 160 A/cm-width as the number of coatings increased from one to four, while the corresponding  $J_C$  was measured to be in the range of 0.84-1.21 MA/cm<sup>2</sup>. Both the  $I_C$  and  $J_C$  decreased when an additional coating was applied due to microstructural degradation, indicating that the optimum thickness is in the range of 1.1-1.8  $\mu\text{m}$ . As the results of microstructural observation, it was considered that some amorphous phase, a-axis YBCO grain and secondary phases such as BaCuOx and CuO in layer interfaces were the possible causes for the decrease in the  $I_C$  and  $J_C$  for the thicker films.

Keywords: critical current, multi-coating, MOD method, YBCO films

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