

Effect of Source Composition Ratio on YBCO Deposition by a MOCVD Process

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YBCO films were grown on (100) MgO single crystalline substrates by a metal organic chemical vapor deposition (MOCVD) process. Solid type $Y(tmhd)_3$, $Ba(tmhd)_2$, and $Cu(tmhd)_2$ were used as sources. To make single liquid solution, the solid sources were dissolved in tetrahydrofuran (THF). The glass fiber reel-to-reel device was used to supply the sources continuously into the CVD reaction chamber. Heating temperature for the source delivering part was 300 . Because the evaporation kinetics of Ba and Cu source is sensitive to a temperature, it was difficult to deposit a 123 film from stoichiometric 123 composition source. The molar ratio of the $Ba(tmhd)_2$ and $Cu(tmhd)_2$ was thus varied to find the optimum film composition. The oxygen partial pressure and deposition temperature were also varied to establish the deposition condition. The a-axes oriented film was obtained at low deposition temperature while the c-axis oriented film was obtained at higher temperatures. The a-axis grains were dispersed as a discrete form in the c-axis matrix. Phase formation and film orientation and superconducting transition temperature and film composition are reported.

keywords : MOCVD, c-axis oriented film, composition ratio.

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