

Preparation of High J_c YBCO Films on LAO by Spray Pyrolysis Process Using Nitrate Precursors

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High J_c over 1 MA/cm² YBCO film has been successfully prepared using nitrate precursors by spray pyrolysis method. Aerosol droplets generated using a concentric spray muzzle were directly sprayed on a LaAlO₃ (100) single crystal substrate. The cation ratio of precursor solution was Y: Ba: Cu = 1:2.65:1.35. The distance between nozzle and substrate was 15 cm. Deposition temperature was ranging from 750 °C to 800 °C. Deposition pressure was 100 Torr and oxygen partial pressure was varied from 5 Torr to 50 Torr. The microstructure, phase formation, texture development and superconducting properties of deposited films were largely changed with oxygen partial pressure. Deposited films showed a texture with (001) planes parallel to substrate plane. High quality film was obtained when film was deposited at 780 °C with an oxygen partial pressure of 30 Torr. The critical current density (J_c) of the YBCO film was 1.16 MA/cm² at 77 K and self-field.

Keywords : spray pyrolysis, nitrate precursor, YBCO, J_c

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