The Spray Pyrolysis Deposition of 123 Films by Ultrasonic Atomization of Precursor Solution

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$YBa_2Cu_3O_{7-y}$ films have been deposited on $LaAlO_3$ (100) single-crystal substrates by spray pyrolysis method. Ultrasonic atomization was used in order to generate fine droplets of nitrate precursor solution. The cation ratio of precursor solution was Y:Ba:Cu = 1:2:3. The distance between nozzle and substrate was 19.5 cm. C-Axis oriented films were obtained at deposition temperature of around 800~830℃ and working pressures of 12~15 Torr. Oxygen partial pressure was varied from 3 torr to 9 torr. The deposited YBCO films showed morphology of dense surface but large droplets were appeared from place to place. The dependence of operating parameters such as cation stoichiometry, oxygen partial pressure, substrate temperature on the microstructure, evolution of superconducting 123 phases and superconducting properties of deposited films will be discussed.

Keywords : Spray pyrolysis, Ultrasonic atomization, Oxygen partial pressure, CVD, nitrate