Effect of Side Seed on the $Y_{0.5}Sm_{0.5}Ba_2Cu_3O_{7-x}$ Superconductors Fabrication by Melt Infiltration-growth Processing

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This study investigated the effects of side seed on $YSmBaCuO_5$ (211) phase distribution within $Y_{0.5}Sm_{0.5}Ba_2Cu_3O_{7-x}$ (123) phases and superconducting properties of 123 superconductors. The superconductors were fabricated by the melt infiltration-growth processing. When the ratio of 211 to $BaB_3Cu_5O_8$ was 1.2, we were able to obtain optimum condition to prepare the 123 superconductor with well-distributed 211 phases. The particle size of 211 phases was sensitive to heat-treatment temperature, atmosphere, and crystallographic planes in 123 phases at high temperature. When changed the experimental conditions from top seed to side seed, the size of pore and 211 phases decreased and all the second phase distributed homogeneously. As a result of better microstructure, superconducting characteristics of 123 superconductors was also improved.

Keywords: melt infiltration-growth processing, side seed, $Y_{0.5}Sm_{0.5}Ba_2Cu_3O_{7-x}$ superconductors