

Characterization and Electrical Properties in (YNS)BCO Oxides by Rod-type Seeded Melt Growth Process

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Abstract : We have studied the electrical properties and microstructure of $(Y_{0.5}Nd_{0.25}Sm_{0.25})Ba_2Cu_3O_y$ [(YNS)-123] Oxides by rod-type seeded melt growth process(RSMG) in air atmosphere. Rod-type $NdBa_2Cu_3O_y$ (Nd-123) seed crystals made a extrusion process method, were used for achieving the ab-plane alignment having large grains perpendicular to the center of (YNS)-123 samples. The observations using SEM and TEM micrographs of the melt-textured (YNS)-123 samples revealed that the nonsuperconducting $(Y_{0.5}Nd_{0.25}Sm_{0.25})_2BaCuO_y$ [(YNS)211] inclusions are uniformly distributed in the superconducting matrix. The microstructure and electrical properties were investigated by XRD, SEM, TEM and DC SQUID magnetometer. The sample showed a sharp superconducting transition at 90 K. The magnetization values of the (YNS)-123 sample exhibited the enhanced electrical properties, compared with $YBa_2Cu_3O_y$ (Y-123) sample.

Key Words : $(Y_{0.5}Nd_{0.25}Sm_{0.25})Ba_2Cu_3O_y$ [(YNS)-123], Rod-type melt growth process, Seed crystal, $NdBa_2Cu_3O_y$ (Nd-123)