

## Sintering Effect of Ag-doped $Y_2BaCuO_5$ for the Improvement of Superconducting Properties of Infiltrated YBCO Bulk Superconductors

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5 wt.% silver (Ag) doped  $Y_2BaCuO_5$  (Y211) green compacts were sintered at 900°C, 1000°C, 1100°C and 1200°C and then single crystal Y-Ba-Cu-O (YBCO) bulk superconductors were fabricated by an infiltration method. The microstructure investigation was done by an optical microscope (OM) and scanning electron microscope (SEM) for the polished/etched surfaces of the infiltrated samples. The magnetization curves of the rectangular samples with the dimensions of about 2x2.5x2 mm<sup>3</sup> were obtained at 77 K and H//c-axis using a superconducting quantum interference device (SQUID) magnetometer. For oxygen embedding in Y123 samples, the infiltrated YBCO samples were annealed at 450-500 °C for 150 h in flowing oxygen.

The microstructure analysis revealed that the infiltrated samples exhibited a significantly lower porosity and crack free surfaces. A refinement and uniform distribution of the Y211 particles in the  $YBa_2Cu_3O_{7-x}$  (Y123) phase matrix were achieved by sintering the Ag-doped pre-forms. An improvement of the critical current density ( $J_c$ ) was observed with an increase of the sintering temperature. However, the sintering of the Ag doped samples had no effect on the  $T_c$  of the YBCO superconductors. It is concluded that the sintering of Ag-doped pre-forms has a beneficial effect on the morphology, the size and the distribution of Y211 inclusions, leading to microstructural and pinning improvements.

Keywords: Sintering effect, YBCO bulk, Ag doping, infiltration method