

Fabrication and Characterizations of the BSCCO-2212/SrSO₄ Bulk Superconductors

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We fabricated BSCCO-2212 (2212) bulk superconductor and evaluated the effects of annealing temperature (790 - 845 °C) and atmosphere (oxygen and nitrogen) on critical current (I_c) and critical temperature (T_c). It was observed that the I_c of 2212 was significantly dependent on the annealing temperature and reached peak value (378 A at 77 K) at 800 °C. On the other hand, T_c was almost independent of the annealing temperature but dependent on the atmosphere; the T_c was measured to be 89 K after annealing at oxygen atmosphere and it increased to 92 K after additional annealing at nitrogen atmosphere. This improved T_c is considered to be related to the optimized oxygen content of the 2212. It is to be noted that, on the contrary, the additional annealing remarkably degraded the I_c . The possible causes of the variations of the I_c and T_c with the annealing condition will be presented based on the XRD, EPMA, and TEM observations.

Keywords : BSCCO-2212, melt casting process, microstructure, strontium sulfates, texture

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