

## High Critical Current Density of BSCCO-2212 Tube Made by Casting and Mechanical Process

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High critical current density ( $J_c$ ) BSCCO-2212(2212) tube superconductors were made by using a casting and mechanical processes. We fabricated the 2212 rod with conventional casting process and studied the effects of annealing conditions on microstructure and critical properties. From the annealed 2212 rod, we obtained tube shape of bulk by mechanical drilling method. It was found that the microstructures of ingot and annealed rods were different with the size of 2212 rod and tube and the critical properties were improved as the microstructure became homogeneous and uniform. The critical current ( $I_c$ ) of rods increased with increasing annealing time, probably due to increased grain size of 2212. Annealing time of the highest  $I_c$  for the smaller rod (diameter of 10 mm) was shorter(150 hr) than that of the larger rod (diameter of 16 mm, 400 hr). This size effect seems to be related to different grain sizes of the intermediate phases such as 2201 and secondary phases in the ingot. Irrespective of rod size, it was found that the many defects such as secondary phases and pores were in center region and these defects reduce the critical properties of 2212 rod. After removing the center region which contained inhomogeneous microstructures, the  $J_c$  of 2212 bulk (465 A/cm<sup>2</sup>) was significantly improved to 1017 A/cm<sup>2</sup> at 77 K.

Keywords : BSCCO-2212, casting process, critical properties, microstructure