

Influence of Post-growth Thermal Treatments on the Critical Current Density of TSMG YBCO Bulk Superconductors

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Abstract - Oxygenation and thermochemical post-growth treatments of top seeded melt-growth (TSMG) YBCO bulk superconductors can significantly influence critical current density. It is shown that, depending on oxygenation conditions and the size of 211 particles, different reductions of intrinsic critical current density values can be obtained due to the reduction in the sample cross-section caused by the presence of *a/b*-microcracks induced by 211 particles, and *a/b*- and *a/c*-cracks induced by oxygenation. The possibility of eliminating oxygenation cracks by high pressure oxygenation and consequently significantly increasing the macroscopic critical current density is demonstrated. An effective dopant concentration for chemical pinning is proposed and possible clustering of substitutions in the Y123 lattice by thermochemical treatments is shown.

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