

Effect of Texture on Critical Currents in Bi-2212

Bulk Superconductors

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Melt cast processed bulk superconducting $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ (Bi2212) materials with high critical currents are used in industrial applications such as fault current limiters, current leads and magnetic screens (Bi2212 bulks) [1-3]. Despite of almost isotropic grain orientation, critical current densities $J_c(77\text{ K})$ in bulk samples may reach very high values of an order of 4 kA/cm^2 comparable with those in well aligned tapes and wires ($\sim 10\text{ kA/cm}^2$). Such a behavior is difficult to understand within the known models of high-temperature superconductivity. The aim of this work is to study in detail the texture, its effects on J_c , and J_c dependence on the doping state (oxygen contents x in Bi2212). A large difference in preferred orientation of Bi2212 grains is found for tubular, rod and plate samples. Preliminary data suggest that there is a correlation between local texture and J_c and that the difference in preferred orientation also affects the optimum overdoping state: maximum J_c is observed at different x .

[1] Bock J, et al Melt-cast Bi-HTS for fault current limiting devices, presented at PASREG'10 (Washington 2010) [2] Fagnard J-F et al, *Supercond. Sci. Technol.* 23 095012 (2010). [3] R Dommerque et al. *Supercond. Sci. Technol.* 23 034020 (2010).

Keywords: Texture, X-rays, $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$