The Jc dependence on O doping in polycrystalline forms of Bi2212 with various texture

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$Bi_2Sr_2CaCu_2O_{8+x}$ (Bi-2212) is a unique high-temperature superconductor (HTS), in which significant supercurrent may flow in a material that does not have long-range texture. This behavior, which is most clearly observed in melt processed (MP) oxide-powder in tube multifilamentary round-wire and melt-cast processed (MCP) bulk conductors, is not consistent with the known models of current transfer in HTS, In this work, we studied the effect of oxygen doping on the self field critical current densities Jc(T) (T = 66 to 77 K) in only slightly textured MCP bulk material with different extent of preferred orientation, and MP Ag sheathed Bi2212 round wires that have only axial texture and dip coated tapes with rather good out-of-plane alignment. We observed a well reproducible Jc dependence on the oxygen contents *x* with the maximum shifted to the overdoped state with respect to the optimum Tc and strongly dependent on the extent of preferred orientation and measurement temperature. These observation suggest that the ability of Bi2212 to readily adopt both under- and overdoped state is relevant to the issue of current transfer in only slightly textured materials. A program of further studies necessary to understand how a rather high supercurrent finds a path across the system of high-angle grain boundaries in Bi-2212 is discussed.

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