

Growth of Superconducting $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi-2212) Whiskers

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Recent developments suggest that high- T_c superconducting whiskers are very useful in the fabrication of new electronic devices using intrinsic Josephson effects and related phenomena, such as Josephson plasma oscillations. Although a few of growing methods were introduced, the reproducible electrical transport characteristics of single-phase transition are not studied in detail. Here we used Te-doped precursor with the mixed pure powders Bi_2O_3 , SrCO_3 , CaCO_3 , CuO and TeO_2 into the ratios of $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_{2.5}\text{Te}_{0.5}\text{O}_x$. [Nagao et al, APL, 1999] The powders calcined three times at 760~820 °C in air. The calcined powders were pressed into pellets at 60 kN that were 10 mm diameter and 3 mm thickness. The pellets were set in a pure alumina boat and heat treated at 870 °C for 100 h in oxygen with flow rate of 150 ml/min. Whiskers have grown through the pellet surface form 2 to 4 mm in length. Whiskers were measured by resistance-temperature (R-T) characteristics, current-voltage (I-V) characteristics and X-ray diffraction (XRD) patterns.

keywords : $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi-2212), intrinsic Josephson effects, Te-doped precursor, single crystal whisker