

Effect of heat treatment on the Bi-2223 phase formation

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Fabrication of pure Bi-2223 bulk polycrystalline samples is complex due to the formation of several unwanted phases, including Bi-2212, Bi-2201, and Ca_2PbO_4 . Residual secondary phases result in weak intergranular links and flux pinning capability, limiting the application of the Bi-2223 superconductor. In the literature, the effects of heat treatment on the reduction of impurity phases in high-temperature superconductors have been extensively studied, demonstrating the potential to improve T_c and J_c values by carefully tuning the process parameters.

The presented study focuses on the effect of thermal treatment on Bi-1223 high-temperature superconducting samples. The powder processing of $\text{Bi}_{1.7}\text{Pb}_{0.3}\text{Ca}_2\text{Sr}_2\text{Cu}_3\text{O}_{9+\delta}$ superconducting samples was performed at 800°C , and their final synthesis was conducted at various temperatures. As a result, we observed the pure phase of Bi-1223 at a temperature of 850°C .