

THE EFFECT OF MAGNETIC NANOPARTICLE ADDITION ON THE SUPERCONDUCTING PROPERTIES OF $\text{Bi}_{1.6}\text{Pb}_{0.4}\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_y$ SUPERCONDUCTORS

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ABSTRACT

Sm₂O₃ nanoparticle was added to Bi-2223 superconductor prepared by solid state reaction technique with intermediate grinding. A stoichiometric precursor of $x=0.00-0.05$ Sm₂O₃ nanoparticle is systematically added to the well balanced $\text{Bi}_{1.6}\text{Pb}_{0.4}\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_y$ in order to trace the effect of nanoparticles addition to the system. Microstructure, resistive transitions, phase volume, and cell parameters were hence investigated. Addition of Sm₂O₃ nanoparticle is found to slowly decrease the Bi-2223 phase volume and the resistive transitions for $x=0-0.02$ samples whereas accelerated formation of the Bi-2212 phase is detected for further additions. Changes in superconducting properties of Sm-added Bi-2223 system were discussed and the findings were further compared with available literature.

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