

Reversible Magnetic Properties of Aligned High T_c - Superconducting $\text{SmBa}_2\text{Cu}_3\text{O}_x$ Powder Composites

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We have carried out magnetization measurements on aligned high- T_c superconducting $\text{SmBa}_2\text{Cu}_3\text{O}_x$ powder composites in the magnetically reversible region, with the applied field parallel to the c axis. By employing a model suggested by Hao et al. [Phys. Rev. B 43, 2844(1991)], the values of the penetration depth, the coherence length, and the critical fields are obtained along with the Ginzburg-Landau parameter κ_c . The results show that, below 80K, κ_c of $\text{SmBa}_2\text{Cu}_3\text{O}_x$ decreases slowly as expected by the theoretical calculations. Additionally, we have extracted the penetration depth λ near T_c again from linear relations of magnetization versus $\ln H$. The $\lambda(T)$ results are consistent with the behavior expected from BCS theory.

keywords : aligned high T_c - superconductor, Ginzburg-Landau parameter, $\text{SmBa}_2\text{Cu}_3\text{O}_x$