STUDY OF HIGH - T_C SUPERCONDUCTOR WITH FINE MAGNETIC PARTICLES COMPOSITES

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9.7 cm

The magnetic state of magnetic material in a composite system of magnetic and high T_c - superconducting powder affects the flux exclusion properties of superconducting materials. The composite systems as a mixture of fine magnetic particles of Fe_3O_4 (10 nm in diameter) and superconducting powder (particle size 5 - 15μm) such as $Bi_{1.8}Pb_{0.2}Sr_2Ca_2Cu_3O_{10+x}$ and $YBa_2Cu_3O_{7-x}$ have been prepared. The influence of internal magnetic field (generated by magnetic particles) on the superconducting properties of prepared composites have been studied as a function of concentration of magnetic particles and their magnetic state. The zero field and field cooling magnetization as a function of temperature and magnetic field was measured using standard VSM magnetometer. The magnetic flux exclusion properties of superconducting material were affected by the presence of internal magnetic field larger than the lower critical field of superconducting material. The experimental data were discussed in the framework of the theory where a distribution of internal magnetic field was taken into account.

13.4 cm

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