

Grain - matrix mosaic contribution to ac losses in Ni-doped BSCCO cylinders.

ABSTRACT

The measurements of ac susceptibility $\chi = \chi' + i\chi''$ is performed to determine the characteristics of intergranular components in sintered $\text{Bi}_{1.6}\text{Pb}_{0.4}\text{Sr}_2(\text{Ca}_{1-x}\text{Ni}_x)_2\text{Cu}_3\text{O}_\delta$, ($x = 0.0 - 0.05$) polycrystalline cylinders prepared by the conventional route. Theoretical values of for idealized cylinder were calculated in the range " $\chi_{\text{max}} \leq k \leq 10$ ", correspondence of the Bean and the simplified Kim critical state models. Magnetization curve for various stages in the specimens is hence approximated. It is found that Ni content in BSCCO system changes the effective volume fraction of the grains, field dependence of the intergranular critical current density, transition temperature, and the intergranular pinning property.

Keyword: Grain matrix mosaic contribution; BSCCO cylinders; Superconductivity.