

Superconducting Properties of Fe Doped in Cu-Site of Bi_{1.6}Pb_{0.4}Sr₂Ca₂Cu_{3-x}Fe_xO_y

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Abstract : Fe₂O₃ was doped to Bi-2223 superconductor prepared in bulk form using high purity oxide powders via solid state reaction technique with intermediate grinding. A stoichiometric of x=0.00, 0.02, 0.04, 0.06, 0.08 and 0.10 Fe are systematically added to the well balanced Bi_{1.6}Pb_{0.4}Sr₂Ca₂Cu_{3-x}Fe_xO_y in order to trace the effect of Fe doping to the system. Microstructure, resistive transitions, phase volume, and cell parameters were hence investigated. Substitution of Fe is found to slowly decrease the Bi-2223 phase volume and the resistive transitions for x=0.00 - 0.10 samples whereas accelerated formation of the Bi-2212 phase is detected for further substitutions. Changes in superconducting properties of Fe-doping Bi-2223 system were discussed and the findings were further compared with available literature.

Keywords : BSCCO, critical temperature, critical current density, XRD, flux pinning

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