

The influence of samarium doping in Bi_{1.6}(Pb_{0.4})Sr_{2-x}Sm_xCa₂Cu₃O_y prepared by coprecipitation method

ABSTRACT

The influence of Sm doping on the phase formation, normal state properties and microstructure development of Bi-2223 superconductors was systematically investigated. Samarium was incorporated in the strontium site with x ranging from 0.00 to 0.30 prepared via coprecipitation technique. The four point probe measurements showed the loss in metallic behaviour for the samples with Sm doped above x=0.2. XRD results showed the decrease of the volume percentage of the 2223 phase followed by increasing in the density of the lattice. The SEM micrographs showed the decrease in the grain size for all samples containing samarium. The temperature dependence of ac susceptibility data shows the shifting towards lower temperature as the Sm concentration increases presence of low T_{conset} phase. The imaginary component, χ'' , shows a decrease in the intergranular coupling peak, T_p, towards lower temperature as the Sm concentration increases. Samarium did not enhance the T_c(R=0) but gradually decreases its value from 102. K to 52 K for x=0.00 to x=0.20 respectively.

Keyword: High temperature superconductors; Oxalic precursor; Coprecipitation