Magnetic and structure properties of Cd doping Bi-2223 superconductor

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Abstract
In this paper, Bi\(_{1.64-x}\)Pb\(_{0.36}\)Cd\(_x\)Sr\(_2\)Ca\(_2\)Cu\(_3\)O\(_y\) (BPCSCCO) superconductor with \(x = 0.0, 0.02, 0.04\) and 0.06 is made by the solid state reaction method. The magnetic susceptibility measurements were performed using AC susceptometer. The microstructure and morphology of the samples have been studied by X-ray diffraction, scanning electron microscope and energy dispersive X-ray. The results show that the partial substitution of Pb for Bi in the Bi-based superconductor increases the volume fraction of Bi-2223 phase. We also found that by doping of Cd, the high \(T_c\) phase is promoted and stabilized in the Bi-Pb-Sr-Ca-Cu-O system. The results of the X-Ray diffraction patterns and magnetic susceptibility measurements show that the low amount of Cd and long annealing time enhance the fraction of Bi-2223 phase. The maximum value volume fraction of Bi-2223 phase for sample with annealing time of 270 hours and 0.04 of Cd doping is obtained.

Keywords: magnetic susceptibility, Bi-based superconductor, doping, cadmium

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