

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Investigation of some physical properties of gold diffusion-doped $\text{Bi}_{1.8}\text{Pb}_{0.35}\text{Sr}_{1.9}\text{Ca}_{2.1}\text{Cu}_3\text{O}_y$ superconductors OZGUR OZTURK, Abant Izzet Baysal University, MUSTAFA YILMAZLAR, Sakarya University, TAYFUR KUCUKOMEROGLU, Karadeniz Technical University, OSMAN GORUR, Rize University, CABIR TERZIOGLU, Abant Izzet Baysal University — We have investigated the effect of the gold-diffusion doped Bi-2223 superconducting samples on the crystal structure and superconducting properties using XRD, SEM, T_c , J_c , and room temperature resistivity measurements. Doping of Bi-2223 was carried out by means of gold diffusion from an evaporated onto pellets at the sintering. XRD patterns and SEM micrographs are used to obtain information about Bi-2223 phase ratio, lattice parameters calculations and grain size, respectively. The gold diffusion in the $\text{Bi}_{1.8}\text{Pb}_{0.35}\text{Sr}_{1.9}\text{Ca}_{2.1}\text{Cu}_3\text{O}_y$ has been also studied over the temperature range 500-800 °C using the technique of successive removal of thin layers and measurement of the sample resistivity at room temperature. The temperature dependence of the Au diffusion coefficient in the range 500-800 °C was described by the relation $D=4 \times 10^{-4} \exp(-1.08 \text{ eV}/k_B T)$. For the Au-doped sample, the critical transition temperature and J_c were increased from 100 ± 1 K to 104 ± 1 K and from 40 and 125 A cm^{-2} , respectively, in comparison with those of undoped Bi-2223. The possible reasons for the observed increases in critical temperature and critical current density due to Au diffusion were discussed.

Ozgur Ozturk
Abant Izzet Baysal University

Date submitted: 28 Nov 2006

Electronic form version 1.4