

Abstract Submitted  
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**Transport microstructure and mechanical properties of Au diffusion-doped Bi-2223 superconductors**<sup>1</sup> O. OZTURK, Kastamonu Univ. , C. TERZIOGLU, A. VARILCI, I. BELENLI, Abant Izzet Baysal Univ. — We have investigated the effect of the gold-diffusion on the mechanical properties of the *Bi-2223* superconducting samples with different annealing times (10, 20 and 50 hours). The samples are prepared by the conventional solid-state reaction method in the polycrystalline bulk form. Doping of Bi-2223 was carried out by means of gold diffusion during sintering from an evaporated gold film on pellets. The experimental works in this study consist of dc electrical resistivity measurements for electrical and superconducting properties, microhardness measurements for mechanical properties, X-ray diffraction for phase analyses and lattice parameters, and scanning electron microscopy for microstructure examination. These measurements showed that Au-doping, in comparison with the undoped samples, increased the critical transition temperature and enhanced formation of high- $T_c$  phase. Additionally, microhardness and grain size were also improved with increasing amount of diffusion. Moreover, the diffusion-annealing time decreased the number and size of voids and increased the transition temperature. The experimental results of hardness measurements were analyzed using the Kick's law, modified proportional specimen resistance (MPSR) model and the Hays-Kendall (HK) approach. Among them HK approach was the most successful.

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