

Abstract Submitted
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Investigation of Some Physical Properties of Gd added Bi-2223 Superconductors MURAT ERDEM, Abant Izzet Baysal University, OZGUR OZTURK, Kastamonu University, HUSEYIN AYDIN, MUSTAFA AKDOGAN, CABIR TERZIOGLU, AHMET VARILCI, IBRAHIM BELENLI, Abant Izzet Baysal University — Static microindentation, XRD, SEM, DC electrical resistivity and critical current density measurements were performed to investigate some physical properties of $\text{Bi}_{1.8}\text{Pb}_{0.35}\text{Sr}_{1.9}\text{Ca}_{2.1}\text{Cu}_3\text{Gd}_x\text{O}_y$ superconducting samples with $x=0.0, 0.1, 0.3, \text{ and } 0.5$. The indentation load versus diagonal length of the samples under different indentation loads in the range of 0.245-2.940 N were presented. The microindentation measurements showed that, for the Gd added sample, the load dependent (apparent) microhardness value (H_v) is lower in comparison with that of the pure sample($x=0$). The values of H_v were found to be load dependent. In addition, we extracted the load independent (true) microhardness using the Kick's law, proportional specimen resistance (PSR), modified proportional specimen resistance (MPSR) model and the Hays-Kendall (HK) approach and compared the true hardness with the apparent hardness. We observed from the transport measurements that addition of Gd decreased T_c and J_c . In addition, surface morphology and grain connectivity of the samples were degraded and the high- T_c phase of the samples decreased with increasing Gd addition. The possible reasons for the observed degradation in microstructure, superconducting and mechanical properties due to Gd addition were discussed.

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