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Mechanical and superconducting properties of $\mathbf{Bi_{1.8}Pb_{0.35}Sr_{1.9}Ca_{2.1}Cu_3Gd_xO_y}$ system[1] MUSTAFA AKDOGAN, Abant Izzet Baysal University, OZGUR OZTURK, Kastamonu University, HUSEYIN AYDIN, MURAT ERDEM, CABIR TERZIOGLU, Abant Izzet Baysal University — The influence of addition of the rare earth ion *Gd* in $Bi_{1.8}Pb_{0.35}Sr_{1.9}Ca_{2.1}Cu_3Gd_xO_y$ superconductor has been investigated by varying *Gd* addition (x=0, 0.1, 0.2, 0.3, 0.4 and 0.5). The samples were prepared by standard solid-state reaction methods. Phase analyses of the samples by X-ray diffraction (XRD), microstructure examination by scanning electron microscopy (SEM), superconducting properties by dc electrical resistivity and mechanical properties by static Vickers hardness measurements have been carried out to assess the effects of *Gd* addition. These measurements indicated that the superconducting transition temperature, Vickers hardness, Young's modulus, yield strength, fracture toughness values of the samples strongly depend on the *Gd* addition. The values of T_c, H_v, E, Y and K_{IC} of the samples decreased with the increase in *Gd* addition. Mechanical properties of the samples are also found to be load dependent. In addition, we have calculated the true (load independent) hardness, Young's modulus, yield strength, and fracture toughness of the samples. From XRD and SEM analyses, the addition of the sample by *Gd* degrades formation of the high-T_c *Bi-2223* phase, and surface morphology and grain connectivity in comparison with undoped sample, respectively.

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