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Influence of diffusion-annealing time on the mechanical properties of bulk $Bi_{1.8}Pb_{0.35}Sr_{1.9}Ca_{2.1}Cu_3O_y$ superconductors diffusion-doped with Fe.[1] MUSTAFA AKDOGAN, Abant Izzet Baysal University, OZGUR OZTURK, Kastamonu University, ERSIN YUCEL, ERDAL BEKIROGLU, Abant Izzet Baysal University, MUSTAFA YILMAZLAR, Sakarya University, CABIR TERZIOGLU, Abant Izzet Baysal University — In order to investigate the role of Fe doping and diffusion-annealing duration on the mechanical and superconducting properties of Bi-Pb-Sr-Ca-Cu-O, $Bi_{1.8}Pb_{0.35}Sr_{1.9}Ca_{2.1}Cu_3O_y$ superconductors were prepared by standard solid-state reaction methods. Doping of Bi-2223 was carried out by means of iron diffusion during sintering from an evaporated iron film on pellets. The investigations consist of SEM, dc resistivity and hardness measurements. These measurements indicated that the Fe doping and diffusion-annealing time increased the T_c, J_c, Vickers hardness (H_0), Young's modulus(E), yield strength(Y), fracture toughness(K_{IC}) values and improved the grain connectivity. The mechanical properties of the samples were found to be load dependent and on the diffusion-annealing time. In addition, we calculated the load independent H_0, E, Y, and K_{IC} of the samples. Possible reasons for the observed improvements in the superconducting and mechanical properties due to Fe diffusion are discussed.

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