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Calculation of diffusion coefficient in Au diffusion-doped $\mathbf{Bi_{1.8}Pb_{0.35}Sr_{1.9}Ca_{2.1}Cu_3O_y}$ by EDXRF measurements[1] MUSTAFA AKDOGAN, Abant Izzet Baysal University, OZGUR OZTURK, Kastamonu University, UGUR CEVIK, Karadeniz Technical University, AHMET VARILCI, CABIR TERZIOGLU, Abant Izzet Baysal University — Gold (Au) diffusion in superconducting $Bi_{1.8}Pb_{0.35}Sr_{1.9}Ca_{2.1}Cu_3O_y$ was investigated over the temperature range 500-800 $^\circ$C by the EDXRF technique. It is found that the Au diffusion coefficient decreases as the diffusion-annealing temperature decreases. The temperature dependences of Au diffusion coefficient in grains and over grain boundaries are described by the relations D_1=6.7 x 10^{-5}exp(-1.19eV/k_BT) and D_2=9.7 x 10^{-4}exp(-1.09eV/k_BT), respectively. The diffusion doping of Bi-2223 by Au causes a significant increase of the lattice parameter c by about 0.19%. For the Au-diffused samples, transport measurements indicated the T_c increased from 100 to 104K and the J_c increased from 40 to 125Acm^{-2}, in comparison with those of undoped samples. From SEM and XRD measurements it is observed that Au doping of the sample also improved the surface morphology and increased the ratio of the high-T_c phase to the low-T_c phase. The possible reasons for the observed improvement due to Au diffusion are also discussed.

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