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The effect of multilayered $Bi_{1.8}Pb_{0.4}Ca_{2.2}Sr_2Cu_3O_x$/Ag on superconducting and microstructure properties of $Bi_{1.8}Pb_{0.4}Ca_{2.2}Sr_2Cu_3O_x$[1]

MUSTAFA AKDOGAN, CABIR TERZIOGLU, IBRAHIM BELENLI, Abant Izzet Baysal University — A precursor powder with a nominal chemical composition of $Bi_{1.8}Pb_{0.4}Ca_{2.2}Sr_2Cu_3O_x$ was used to fabricate the multilayered $Bi_{1.8}Pb_{0.4}Ca_{2.2}Sr_2Cu_3O_x$/Ag samples (number of layers was 2, 4 and 8) using the powder-in-tube method (PIT). The density of powder increases during the drawing procedure and inside the composite wires of the final diameter is 3.54 mm. By an intermediate rolling, pressing and annealing procedure, the wires were rolled to obtain tapes. The rolling process was not effective in obtaining further substantially increase of the powder density, but greatly improved the orientation of ceramic grains inside the silver sheath. The sample is composed of a highly oriented Bi-2223 phase in the region near to the Ag layer. The eight-layered sample exhibits a rather high I_c value of 110 A. T_c and J_c are enhanced by increasing the number of Ag layers. The formation of the dense oriented structure is near the interface between oxide and the Ag layer. This suggests that Ag plays an important role in the improvement of J_c.

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Mustafa Akdogan
Abant Izzet Baysal University

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