Fabrication of $Bi_2Sr_2CaCu_2O_x$ Superconductor Thick Films by Using Cu-Free Precursors on Ni Substrates

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We have studied the forming behavior of $Bi_2Sr_2CaCu_2O_x$ in the heat-treatment process of BSCCO thick films on Ni tapes. Well-oriented $Bi_2Sr_2CaCu_2O_x$ (Bi2212) superconductor thick films were formed successfully on Ni tapes by liquid reaction between Cu-free precursors and electrodeposited copper on the Ni tapes. The specimens were prepared by a screen-printing method with Bi_2O_3, $SrCO_3$, $CaCO_3$ powders, and copper on Ni tapes. Heat treatment was performed in the temperature range of 800-870℃ for several minutes in air. The phase analyses and the microstructures of the high temperature superconductor thick XRD and SEM analyzed films, respectively, and the electric properties of superconductor thick films were examined by the four probe method. At heat-treatment temperature, the superconductor thick films were formed through a partially molten state by liquid reaction between CuO films and the precursors on Ni tapes.

Keywords : microstructure, BSCCO thick films, Ni tapes, screen printing