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Investigation of the magnetic field angle dependence of resistance, irreversibility field, upper critical field and critical current density in DC sputtered Bi-2223 thin film¹ MURAT ERDEM, MUSTAFA AKDOGAN, GURCAN YILDIRIM, SEVGI POLAT ALTINTAS, AHMET VARILCI, CABIR TERZIOGLU, Abant Izzet Baysal University — We measured resistivity and transport critical current density as a function of DC magnetic field and the angle between the surface of the film and the magnetic field on ex-situ annealed, c-axis oriented Bi-2223 thin films fabricated by DC sputtering method. Irreversibility field and upper critical field were determined from the resistivity vs. the applied magnetic field graph. It is observed that the superconducting properties of the films strongly depend on the direction and strength of the field. Penetration depths and coherence lengths were also determined from the irreversibility field and upper critical field versus temperature graphs, respectively. The anisotropic J_c behavior of the film is found to be intrinsic. We provided a theoretical analysis of the obtained results in the framework of intrinsic pinning theory of superconductors. Microstructural properties of the produced films were investigated by XRD and SEM measurements. XRD patterns indicate that the films are c-axis oriented based on the prominent (001) peaks. SEM images show needle-like grain structures dominate the surface morphology of the films.

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