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Superconducting and Critical Current Properties of $NiBi_3$ Microfibers and Thin Films[1] NEEL HALDOLAARACHCHIGE, YIMIN XIONG, PHIL ADAMS, DAVID YOUNG, Louisiana State University — We report the superconducting and critical current properties of thin films of $NiBi_3$ formed on the surface of carbon microfibers and on sapphire substrates. The $NiBi_3$ coated C-fibers were prepared by reacting 7-μm diameter Ni-coated carbon fibers with Bi shot, and the thin films on sapphire were formed by exposing electron-beam deposited Ni films to Bi vapor. The fibers and films show $T_c = 4.25$ K and $T_c = 4.35$ K, respectively, which was slightly higher than that of bulk polycrystalline $NiBi_3$. The extrapolated upper critical fields of the fibers [$H_{c2}(0) = 12$ T] and films [$H_{c2}(0) = 9$ T] are higher than the reported data on polycrystalline samples. The temperature dependence of the critical current density (J_c) is well described by Ginzburg-Landau theory and gives an extrapolated value of 5.26×10^5 A/cm^2.

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