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Anisotropy of superconducting properties of flexible magnesium-diboride-coated carbon nanotube yarns[1] JULIA BYKOVA, MÁRCIO DIAS LIMA, AUSTIN HOWARD, NanoTech Institute, The University of Texas at Dallas, M. TARANOV, Y. KONYUKHOV, Moscow Institute of Steel and Alloys, MYRON SALAMON, MPA-CMMS, Los Alamos National Laboratory, RAY BAUGHMAN, ANVAR ZAKHIDOV, NanoTech Institute, The University of Texas at Dallas — Flexible ultralight magnesium-diboride-coated carbon nanotube (MgB_2-CNT) yarns have critical temperatures up to 37 K, high critical currents and fields comparable with conventional superconducting wires. Superconducting yarns containing MgB_2-CNT nanofibers have been prepared by conformal coating of CNT sheets with boron in photothermal chemical vapor deposition, and annealing in magnesium vapors. Electrical transport measurements in a magnetic field, whose direction is varied relative to the sample orientation, showed anisotropy in superconducting properties. The critical field anisotropy ratio $H_{c2}^{\parallel}/H_{c2}^{\perp}$ reaches 1.2-1.4 over a wide temperature range below T_c, comparable to but slightly lower than the factor 1.4-2 of epitaxial MgB_2 thin films. An X-ray diffraction study confirmed the crystalline anisotropy of composite wires and showed, that the MgB_2 grains prefer to grow with the *ab*-plane parallel to the carbon nanotube walls and the yarn axis.

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