

Abstract Submitted
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Development of Ti-sheathed MgB₂ Superconducting Wires with Very High Current-carrying Capability HUI FANG, GAN LIANG, CAD HOYT, SHELLEY KEITH, Sam Houston State University, M. HANNA, M. ALESSANDRINI, F. YEN, B. LV, Z. TANG, K. SALAMA, University of Houston — Ti-sheathed MgB₂ wires with very high magnetic critical current density (J_c) have been fabricated with the *in situ* powder-in-tube method. The wires were characterized by magnetization, electrical resistivity, x-ray diffraction and scanning electron microscopy measurements. At 5 K, the magnetic J_c measured in magnetic fields of 2 Tesla (T) and 5T are about 4.1×10^5 A/cm² and 7.8×10^4 A/cm², respectively. The J_c value at 20 K and 0.5 T is 3.6×10^5 A/cm². The superconducting volume fraction for the core material of the MgB₂wires is about 71%. These results show that the magnetic J_c for the present Ti-sheathed MgB₂ wires is substantially higher (40%-300% higher) than the best magnetic J_c results available for the Fe-sheathed MgB₂ wires made by similar processes. Because of such excellent J_c , it is anticipated that the Ti-sheathed MgB₂ wires developed by the present technique are very promising for future lightweight superconducting magnet applications.

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