

Abstract Submitted
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Study of the Effects of the SiC Doping on the Critical Current Density of the Ti-sheathed MgB₂ Superconducting Wires¹ GAN LIANG, HUI FANG, SHELLEY KEITH, CAD HOYT, Sam Houston State University, MINA HANNA, F. YEN, B. LV, M. ALESSANDRINI, K. SALAMA — The effects of the SiC doping on the magnetic critical current density (J_c) of the Ti-sheathed MgB₂ superconducting wires were studied for the first time. Two groups of Ti-sheathed MgB₂ wire samples were prepared and studied: for the first group, the size of the SiC particles was 20 nm and the concentrations were 5%, 10%, and 15%; for the second group, the concentration of the SiC dopant was 10% and the sizes of the SiC particles were 20 nm, 45 nm, and 100-200 nm. Contrary to the J_c results reported on the SiC-doped Fe-sheathed MgB₂ wires, we found that the J_c for the SiC-doped Ti-sheathed MgB₂ wires decreases with both the concentration and particle size of the SiC dopant. We found that only for the wires with 100-200 nm SiC size, the J_c is greater than that of the undoped MgB₂ wires. This unusual dependence of J_c on the size and concentration of the SiC dopant is discussed in association with the results from the magnetization, electrical resistivity, x-ray diffraction and scanning electron microscopy measurements.

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Gan Liang
Sam Houston State University

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