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Effects of Sintering Temperature on Superconductivity in undoped and SiC-doped MgB_2/Ti Wires CAD HOYT, HUI FANG, JOHN DOUGLAS, K. WEST, GAN LIANG, Sam Houston State University, SAMARESH GUCHHAIT, JOHN MARKERT, University of Texas at Austin — The effects of sintering temperature on the superconducting properties of both undoped and SiC-doped MgB_2 wires have been studied. The wires were fabricated by in situ powder-in-tube (PIT) method and characterized by x-ray diffraction, magnetization, scanning electron microscopy, and electrical resistivity measurements. Two groups of wire samples were prepared: the first group contains a pure MgB_2 core and the second contains MgB_2 core doped with 10 wt.% of 20 nm SiC. Both groups of samples were sintered for 30 minutes at the following temperatures: 650 $^\circ$C, 700 $^\circ$C, 750 $^\circ$C, 800 $^\circ$C, 850 $^\circ$C. It was found that the cores of these wires are almost in pure MgB_2 superconducting phase and the superconducting transition temperatures of the wires are about 36 K. For both groups of samples, the critical current density (J_c), measured at 5 K and 20 K in fields up to 7 Tesla, peaks up at sintering temperature 800 $^\circ$C. This result is in sharp contrast with recent results observed for Fe-sheathed wires for which the maximum J_c was achieved at lower sintering temperatures. Detail discussion will be given to explain such dependence of J_c on the sintering temperature.

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