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Investigation on Minimum Tolerable Bending Diameters of Reacted MgB2 Monofilament Wires

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MgB2 superconductors are recognized as one of the promising superconducting wires for utilizations in a current MRI magnet. However, a practical consideration remains that the critical current density and critical magnetic field of the MgB2 wire strongly depend on the stress applied by bending the reacted MgB2 wire. Therefore, the investigation of the electrical properties of the reacted MgB2 wire under various bending stresses should be thoroughly carried out to determine the minimum winding diameter for the module coil, as well as the persistent current switch for the MRI magnet. In this study, the critical current value of reacted MgB2 monofilament wires, manufactured by Kiswire Advanced Technology Co. Ltd. (KAT), was examined in terms of the bending diameter of the wire at various cryogenic temperatures. Based on the experimental test results, the maximum tolerable bending stress of the MgB2 wire was quantitatively determined. Consequently, the feasibility of the react-and-wind method for the fabrication of MgB2 magnets was also examined in detail.
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