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Wed-Af-Po3.25-09 [112]: Electromechanical Properties Evaluation of Various Multifilamentary MgB2 Wires

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Multifilamentary Magnesium diboride (MgB2) wires are composed of brittle compound filaments and metallic sheath with a sufficiently strong reinforced material. A strong reinforced material provides tolerable stress that increases the filament density and enhances the grain connectivity of the MgB2. However, MgB2 wires are highly attractive for various applications due to its high critical transition temperature. It is considered a promising alternative to HTS wires at a low magnetic field which is suitable for various applications, including medical resonance imaging (MRI), fault current limiters (FCL), wind power generators. This study focused on the evaluation of the Ic-strain behavior of various kinds of multifilamentary MgB2 wires with different mechanical reinforcements. Despite having brittle superconducting filaments, the mechanical reinforcements in MgB2 wires compensate for this weakness which also enhances the electromechanical properties of the wire. In this study, the critical limits of Ic degradation in MgB2 wires were evaluated under uniaxial tension at a magnetic field and temperature, 2 T and 20 K, respectively. The influence of the different reinforcement materials was investigated. The mechanical properties were also determined at RT and 77 K and self-field.

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