



MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: 1643

Type: **Poster Presentation**

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

Wednesday, 25 September 2019 14:00 (2 hours)

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 I_c-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 I_c 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.

This work was supported by a grant from the National Research Foundation of Korea (NRF-2017-001901) funded by the Ministry of Science and ICT (MSIT), Republic of Korea. This research was also supported by the Korea Electric Power Corporation. (Grant number: R18XA03).

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Session Classification: Wed-Af-Po3.25 - MgB₂ and Iron-Based