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Tue-Mo-Po2.07-03 [43]: Charging, Discharging, and Over-current Characteristics of Partially Insulated MgB₂ Magnet Using Cr-coated MgB₂ Wires

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Recently, we developed a 0.5-T/300 mm MgB₂ magnet using the partial insulation (PI) winding technique that only employs layer-to-layer insulations without the turn-to-turn insulations; the magnet was self-protective but has a significant charge-discharge delay. In this study, the use of Cr-coated MgB₂ wires was proposed as an alternative solution to enhance the characteristic resistance of the MgB₂ magnet, in combination with the PI winding technique. The charging-discharging tests confirmed that the charging-discharging rates of the PI magnet that uses Cr-coated wires was ten times faster than the magnet that utilizes uncoated wires. In addition, the self-protective behavior of the PI magnet that uses the Cr-coated wires were verified via the over-current tests. Herein, the feasibility of employing the proposed winding technique for the development of self-protective MgB₂ magnetic resonance imaging magnets with fast charging-discharging rates was discussed in detail.

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