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Thu-Mo-Po4.09-06 [68]: Progress on the Superconducting Joint Technique for the Reacted MgB₂ Wires for MRI Magnet Development

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A superconducting joint technique has been extensively investigated to operate magnetic resonance imaging systems in persistent current mode, which enables a high-resolution level of the magnetic field. We have presented the MgB₂ superconducting joint with unreacted MgB₂ wires that demonstrate the feasibility of the joint technique to be utilized for the MgB₂ MRI magnet development. However, when failure occurred at the already reacted MgB₂ joints and/or wires, the reproduction of the joint using the unreacted joint technique cannot be achieved. Therefore, the superconducting joint technique for the “reacted” MgB₂ wires fabricated via a powder processing method using Mg and B powders (in situ) and reacted MgB₂ powders (ex situ) has been examined in this study. In addition, a lab-made induction furnace that allows the local heating of the joint region was fabricated and utilized for the joint procedure. The superconducting properties (i.e., critical current and index number) of the joint were evaluated with regard to heat treatment temperature and treatment duration time.

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Primary authors: Mr YOO, Byeongha (Korea University); LEE, Haigun (Korea University)

Co-authors: Mr HWANG, Duck Young (Kiswire Advanced Technology Co); Mr NOH, Hyun Sung (Korea University); Mr KIM, Jimin (Korea University); Dr KIM, Young-Gyun (Korea University)

Presenter: Mr YOO, Byeongha (Korea University)

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