



Contribution ID: 553

Type: **Poster Presentation of 1h45m**

## Design and Performance Results of Optimal Vapor-Cooled MgB<sub>2</sub> Current Leads for a 1.5 T MRI Magnet

*Monday, 28 August 2017 13:15 (1h 45m)*

This study presents the design and performance results of a pair of vapor-cooled MgB<sub>2</sub> current leads for a 1.5 T MRI magnet developed by Kiswire Advanced Technology Ltd. in Korea. To reduce the liquid helium (LHe) consumption of the MRI system, the current leads were designed as a retractable type to be detached from the magnet operated under a persistent-current mode. From the cryogenic evaluation, the cold-end heat input of the vapor-cooled current leads was calculated using the LHe consumption measured by a LHe-level sensor and mass flow meter. Furthermore, thermal analysis of the current leads was carried out using the finite element method. During operation tests at various operating currents, the voltage and temperature of the current leads were measured to evaluate the effects of employing the MgB<sub>2</sub> wire on the thermal performance of the leads. In addition, conventional vapor-cooled copper current leads were also examined and the results were compared with the test results of the proposed vapor-cooled MgB<sub>2</sub> current leads.

Acknowledgement: This work was supported by the Materials and Components Technology Development Program of KEIT [10053590, Development of MgB<sub>2</sub> wire and coil with a high critical current and long length for superconducting medical•electric power equipment].

### Submitters Country

Republic of Korea

**Primary authors:** Mr KIM, Jiman (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Prof. LEE, Haigun (Department of Materials Science and Engineering, Korea University, Seoul, Korea)

**Co-authors:** Mr CHOI, Yoon Hyuck (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Mr KIM, Young-Gyun (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Mr SHIN, Iksang (Kiswire Advanced Technology Co., Ltd., Daejeon, Korea); Mr YUN, Subok (Kiswire Advanced Technology Co., Ltd., Daejeon, Korea)

**Presenter:** Mr KIM, Jiman (Department of Materials Science and Engineering, Korea University, Seoul, Korea)

**Session Classification:** Mon-Af-P01.09

**Track Classification:** F7 - Current Leads, Links, and Bus Bars