



Contribution ID: 751 Contribution code: TUE-PO1-722-13

Type: Poster

## Thermal and electrical characteristics of NI HTS coil fabricated by diffusion bonding technique

*Tuesday, 16 November 2021 13:15 (20 minutes)*

No-insulation (NI) winding technique shows superior electrical and thermal performance for high temperature superconducting (HTS) coils compared with the insulation winding technique. However, the NI HTS winding technique is uncertain about the thermal contact resistance between winding turns because the HTS wire has various surface conditions such as roughness and oxidation. In this paper, the diffusion bonding technique is applied to make expectable contact resistance between turns of the NI HTS coil. In order to examine the electrical and thermal characteristics of NI HTS coils, two kinds of NI coils are fabricated by using conventional NI HTS winding and diffusion bonding techniques. The thermal contact resistances of the NI coils are measured in a conduction cooling experimental apparatus applying a heat load to the outside the coil. Then, the electrical contact resistances of the NI coils are evaluated by sudden discharge experiments compared to the expected values at the various temperature from 20 K to 77 K.

[Acknowledgement] This research was supported by Korea Electrotechnology Research Institute(KERI) Primary research program through the National Research Council of Science & Technology(NST) funded by the Ministry of Science and ICT (MSIT) (No. 21A01019) and This work was supported by the Korea Institute of National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (NRF-2019R1A5A8083201)

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**Session Classification:** TUE-PO1-722 Model Coil I