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Current Bypass of a Metal Stitching Smart Insulation 2G HTS Coil

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This study analyzes the current bypass mechanism of a metal stitching smart insulation (SI) coil rolled by coating vanadium oxide (V_2O_3) on a metal stitching wire prepared by generating micro-holes into a second generation (2G) high-temperature superconducting (HTS) wire using a laser and by filling the micro-holes with metal solder material. Results showed that the metal stitching wire with laser-generated holes had a noticeably lower I_c loss due to damage and low turn-to-turn resistance. This facilitated the current bypass at the transient state of the SI 2G HTS coil. For effective analysis, the metal stitching SI coil was compared with a non-metal stitching SI coil, and the positive effect of the metal stitching apart from current bypass was discussed and analyzed.

Primary author: KIM, Hyung-Wook (Korea Electrotechnology Research Institute)

Co-authors: JO, Young-Sik (Korea Electrotechnology Research Institute); Dr KIM, Seog-Whan (Korea Electrotechnology Research Institute)

Presenter: KIM, Hyung-Wook (Korea Electrotechnology Research Institute)

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