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Fri-Mo-Po.01-08: Study on Electrical Contact Resistance of No-Insulation Magnet by Surface Treatment of REBCO tape

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Many studies have focused on different types of no-insulation (NI) high-temperature superconducting (HTS) magnets. In particular, REBCO-based NI magnets have been explored in various forms, including conventional no-insulation magnets with copper stabilizers, cladding methods where high-resistance metals or semi-conducting materials are coated on REBCO tapes, and co-winding methods where REBCO tapes are wound together with high-resistance materials like stainless steel tapes or mesh-shaped metal tapes. Contact resistance has been identified as an important factor in some of these studies, depending on the material properties and manufacturing processes.

In this study, we investigated how the surface condition of the copper stabilizer affects contact resistance. Specifically, we analyzed the changes in contact resistance when the oxide layer on the stabilizer surface was removed using chemical or mechanical methods. Additionally, we examined how contact resistance evolves over time as the oxide layer grows during repeated winding and charge-discharge cycles. These findings can enhance the understanding of contact resistance in NI magnets.

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