



MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: 1512

Type: **Contributed Oral Presentation**

Fri-Mo-Or27-03: Control of contact resistance of a long length REBCO conductor

Friday 27 September 2019 08:30 (15 minutes)

In a REBCO no-insulation (NI) magnet coil, the turn-to-turn contact resistance (R_c) determines the coil's quench self-protection ability, charging delay time and the energy loss during field ramp. Therefore it is critical to control R_c to suitable values. In our previous investigation, we measured R_c at 77 K and 4.2 K under various contact pressures and pressure cycles, and studied the effect of surface coating on R_c . Based on our experiment on short stamp samples, we found a reliable technique to control R_c by oxidizing the surface of the copper stabilizer of REBCO tapes.

In this paper, we developed a prototype reel-to-reel REBCO oxidation system to demonstrate the ability to control R_c of long lengths REBCO conductor. We will present the technical details of the process. The effect of various process parameters will be discussed. In addition, we developed a method of controlling contact resistivity of a REBCO coil by using co-wind stainless steel tapes. In this case, the control of contact resistance is done, also in reel-to-reel fashion, by treating the surface of stainless steel tape. The result of REBCO coil made by these R_c control methods will be presented. Since the understanding of the surface chemical/mechanical process in contact resistivity control is the key to obtain reliable controllable R_c , surface chemistry of both oxidized REBCO and the stainless steel tape is also studied.

Acknowledgement

This work was performed at the National High Magnetic Field Laboratory, which is supported by National Science Foundation Cooperative Agreement No. DMR-1644779 and DMR-1839796, and the State of Florida.

Authors: Dr LU, Jun (MS&T, NHMFL); Mr LEVITAN, Jeremy (MS&T, NHMFL)

Presenter: Dr LU, Jun (MS&T, NHMFL)

Session Classification: Fri-Mo-Or27 - No-Insulation and Insulated REBCO Magnet Technology