MT29 Abstracts and Technical Program



Contribution ID: 818

Type: Poster

Fri-Af-Po.01-08: Impact of bending on the quenching characteristics of Bi-2223/Ag stacked-tape impregnated with solder

Friday 4 July 2025 14:00 (2 hours)

The Bi-2223/Ag high-temperature superconductor (HTS) tape has become one of the best candidate materials for high-performance superconducting magnets due to its high current-carrying capacity and excellent multi-filament stability. To achieve the capability of transporting thousands of amperes or even higher current levels, it is common to assemble multiple sub-cables constructed from stacked-tape impregnated with solder, into a single cable. However, during the winding process of the HTS Coil, the current-carrying performance and thermal stability (quenching) of the cable are often degraded due to the effects of mechanical strain and impregnants. In this study, the evolution of the normal zone in Bi-2223/Ag stacked sub-cables under different bending radii was characterized experimentally, including the changes in critical current before and after triggering quenching. Besides, a finite element analysis (FEA) model is constructed to investigate the quenching propagation. Using this numerical model, we completed the analysis and discussion of the experimental phenomena. Moreover, the quenching characteristics of one HTS conductor integrated with three Bi-2223/Ag sub-cables are also investigated.

Author: Mr LI, Liujiang (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China)

Co-authors: Mr XIA, Chengyang (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Mr WANG, Suxin (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Mr YANG, Yuanpeng (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); TAN, Yunfei (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Ms TIAN, Yutong (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Mr YAN, Yutong (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Mr YAN, Zhiyong (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Mr YAN, Zhiyong (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China); Mr YAN, China)

Presenter: Mr LI, Liujiang (Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan, China)

Session Classification: Fri-Af-Po.01 - Quench Detection and Protection II