Investigation of Electromechanical Properties in REBCO Coated Conductor Tapes by High-Cycle Fatigue Test at 77K

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Introduction

In the second generation (2G) (RE)Ba2Cu3O7-x high-temperature superconducting (HTS) applications, various electromagnetic properties of REBCO CC tapes will critically affect the long-term reliability of superconducting performance if not fully addressed. The evaluation of the characteristics of CC tapes under operating stress conditions is an important procedure to determine the current carrying capacity, its performance, and the reliability of the tapes and systems.

Results and Discussion

Uniaxial tensile loading

- In the second generation (2G) (RE)Ba2Cu3O7-x high-temperature superconducting (HTS) applications, various electromagnetic properties of REBCO CC tapes will critically affect the long-term reliability of superconducting performance if not fully addressed. The evaluation of the characteristics of CC tapes under operating stress conditions is an important procedure to determine the current carrying capacity, its performance, and the reliability of the tapes and systems.

Experimental procedure

Sample specifications

Set-up for Ic measurement during uniaxial tension and fatigue tests

Cross-sectional views

Electromechanical property evaluation under fatigue loading

Fatigue test conditions

FATIGUE test

Fatigue parameters for loading

Comparison of properties at 77 K

Conclusions

This work was supported by a grant from the National Research Foundation of Korea (NRF-2017-001109), funded by the Ministry of Science and ICT (MSIT), Republic of Korea. This research was also supported by the Korea Electric Power Corporate. (Grant number: R18XA03).