



Contribution ID: 189

Type: Poster

Wed-Af-Po.05-06: Electron microscopy investigation of cracks in REBCO tapes by bending and uniaxial tension

Wednesday 2 July 2025 14:30 (2 hours)

There have been increased interests in REBCO Coated Conductor (CC) in applications such as ultrahigh field user magnets as well as magnets for nuclear fusion and high energy physics. The CC tape has good tensile strength in longitudinal direction thanks to its high strength substrate Hastelloy. In ultrahigh field magnets, however, the CC tape could experience electromagnetic stress exceeds the irreversible stress limit, at which point the microcracks are formed and critical current (I_c) is significantly degraded leading to the failure of the magnets. Therefore, the irreversible stress limit of CC is one of the most important properties in applications. There had been intensive studies on I_c versus uniaxial stress of CC. However, the microstructural origin of the I_c degradation of the CC tape is still elusive.

In this work, we report the observation of the cracks resulted from either bending or uniaxial tension in the longitudinal direction by scanning electron microscopy (SEM), transmission electron microscopy (TEM), and scanning transmission electron microscopy (STEM). In particular, the location of the crack initiation will be investigated by TEM at atomic scales. The effect of substrate yielding on the crack formation will be discussed.

Acknowledgement

This work was performed at the National High Magnetic Field Laboratory, which is supported by National Science Foundation Cooperative Agreement No. DMR-2128556, DMR- 2131790, and the State of Florida.

Author: XIN, Yan (FSU)

Co-authors: Dr INGROLE, Aniket (FSU); Dr LU, Jun (FSU)

Presenter: XIN, Yan (FSU)

Session Classification: Wed-Af-Po.05 - HTS Conductors II