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Critical current of various ReBCO tapes under uniaxial strain

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Manufacturing ReBCO tape into a cable structure is suitable for future magnet applications to carry large current and generate high magnetic fields. During cable manufacturing and operation, the ReBCO tape is subjected to combined axial tension, axial compression, bending, and torsion loads. Therefore, mastering the critical current of the ReBCO tape under axial strain is very necessary to design of the cable and the selection of the tape specification. The critical current (I_c) and n -value versus applied uniaxial strain were measured of ReBCO tapes produced by three superconducting manufacturers in China at 77K in self-field with the U-spring devices. The width of the ReBCO tape is from 3 mm to 5 mm, and the thickness of the substrate is from 25 μm to 60 μm . The critical current of most of the tapes is reversible under applied compressive strain. The width of the tape and the thickness of the substrate have an effect on the reversible tensile strain limit. The n -value of the ReBCO tape hardly depends on the strain condition.

Primary author: XIAO, Guanyu (Institute of Plasma Physics, Chinese Academy of Sciences)

Co-authors: ZHOU, Chao (Institute of Plasma Physics, Chinese Academy of Sciences); QIN, Jinggang; JIN, Huan; GAO, Peng (Institute of Plasma Chinese Academy of Sciences); LIU, Huajun (Chinese Academy of Sciences); LIU, fang

Presenter: JIN, Huan

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