

Critical Current Measurements of a Tape in the Hybrid Multi-Stacking High T_c Superconducting Tapes

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A new 200 m high T_c superconducting DC cable test facility was successively constructed in 2010. This coaxial power cable is composed of two superconducting layers of the DI-BSCCO[®] tapes spirally and closely surrounding a copper former. The number of the tapes in each layer is different due to their different radii. We have investigated the effect of the way of the tape winding on the critical current (I_c) of the tapes in order to optimize the cable configuration for DC transmission.

This paper will present the measurements of I_c of DI-BSCCO[®] in the hybrid multi-stacking tapes composed of YBCO and BSCCO tapes by controlling the transport current in each tape independently. I_c measurement is performed with the standard four-probe method at liquid nitrogen temperature. The magnetic field distribution around the tapes by the finite element method is calculated to demonstrate the effects on the self field from the adjacent tapes in the hybrid multi-stacking tapes. The enhancement and degradation of I_c s in the hybrid multi-stacking tapes are observed on contract to that of the single tape. Through the experiments, we started to investigate the tape configuration of the DC power cable to enhance the superconducting characteristics.