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Evaluation of magnetic field dependence of interface resistivity in REBCO tape with the contact-probing current transfer length method

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In REBCO tape having multi-layered structure, resistance of Cu/Ag and Ag/REBCO interfaces (interface resistance) is one of the major factors of joint resistance of tape-to-tape joints. Since the interface resistance depends on the manufacturer and/or lot number of REBCO tapes, it is necessary to evaluate the interface resistance beforehand at temperatures and magnetic fields of the operating environments of applications. In a previous research, the contact-probing current transfer length (CTL) method was proposed as a nondestructive method to evaluate interface resistivity (interface resistance for unit area). The temperature dependence of the interface resistivity has been evaluated with this method. In the present research, the authors evaluated the magnetic field dependence of the interface resistivity for several kinds of REBCO tapes.
The temperature of the test section was controlled by a conduction cooling system and heaters. The CTL was obtained by measuring electric potentials at seven points on the REBCO tape with contact probes at 10–70 K and 0–15 T. A numerical simulation was also conducted to evaluate the relationship between the CTL and the interface resistivity. Comparing the relationship and the experimentally evaluated CTL, the interface resistivity was derived for each REBCO tape.
As a result, interface resistivity tended to decrease with increasing magnetic field. The result indicated that resistance dependence of the Cu/Ag and/or Ag/REBCO interfaces on the magnetic field is different from that of ordinary metals.

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