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Angular dependence of critical current for REBCO coated conductor under various bending strains

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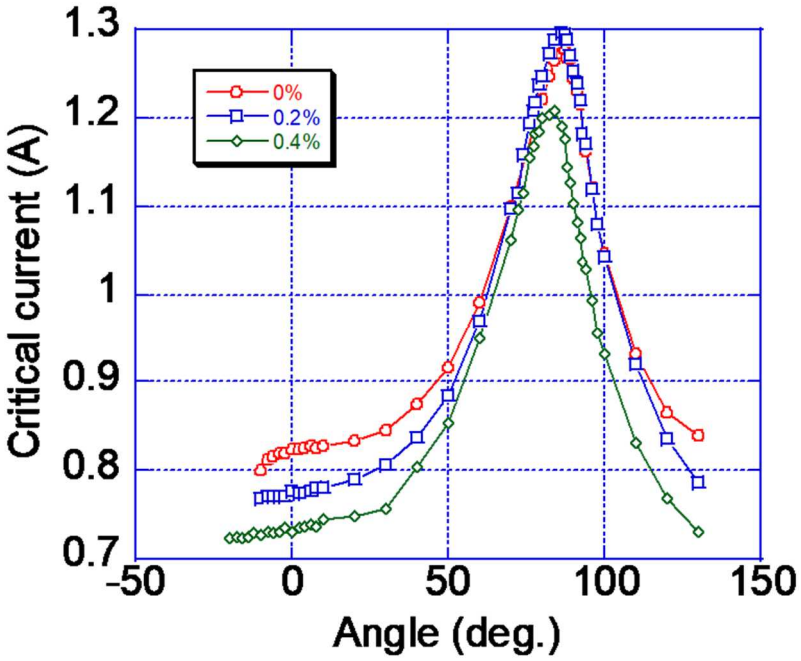
$REBa_2Cu_3O_y$ (REBCO, RE = Y, Gd, Sm, Nd, etc) coated conductors are expected to be applied to high magnetic field superconducting magnets because the conductors have very high mechanical properties and high superconducting properties even in a high magnetic field. In addition, it is well known that the critical current of REBCO coated conductors follows an almost parabolic dependence as a function of axial strain [1]. In this study, we focused on the strain effect of the REBCO. In order to improve critical current of the REBCO coated conductors using the strain effect, the relationship between strain and critical current was investigated. A superconducting properties measurement device in various environment was developed. The device can measure critical current at low temperature, various magnetic field and various field angles under bending strains.

The GdBCO coated conductor, produced by Fujikura, with 0.2 mm micro-bridge was prepared. The angular dependences of critical currents for GdBCO coated conductors under various bending strains are shown in Fig. 1. The critical currents at various magnetic field angles and bending strains were estimated by the new device. We found that the critical current at angle of 90° under 0.2% bending strain has a little enhancement by the strain. This behavior is different from the strain effect at angle of 0°.



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