1. Introduction

Evaluation of magnetic moment relaxation in CC tape strand is important for especially DC magnet applications such as MRI and NMR because it affects field homogeneity and temporal stability in the magnet. Magnetic moment induced in the tape strands becomes much larger than the case of conventional round wire and depends on the angle of external magnetic field. In addition, measurement time under the each condition should be also an issue.

In this study, we have investigated magnetic relaxation of APC introduced high performance GdBCO CC by using magnetic moment vector measurement including inclined external magnetic field. Then, we have analyzed the results within a frame work of the percolation transition model. This allows us to describe E-J characteristics as well as magnetic relaxation analytically.

2. Experiment

• sample

Sample is etched to 3mm x 1mm rectangular form.

• measurement

Magnetic moment $m_1$ & $m_2$ are measured by SQUID. Its signal are obtained while picking a magnetized sample upward through these second-order gradiometers.

• E-J characteristic estimation

$$ E = \frac{\mu_0 G}{2d(l+w)} \frac{dm}{dt} $$

$J = \frac{12m}{w^2d(3l-w)}$

3. Results & Discussion

3.1 E-J characteristic model

4. Conclusion

• Magnetic relaxation can be described quantitatively from E-J curves measured by standard four-probe method by using the percolation transition model taking into account flux creep with a distribution of activation energy.

• Clear deviation from the $n$-value model has also been confirmed from the experimental results.

• We have also succeeded in obtaining magnetic relaxation under inclined external field by using magnetic moment vector measurement.

The vector measurement will allows us to investigate magnetic relaxation under low angle close to parallel to CC surface.

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Critical Current Density in Gd$_1$Ba$_2$Cu$_3$O$_{7-8}$ Coated Conductor under the Influence of Flux Creep

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