

Noncontact measurement of current flows in multi-filamentary YBCO tape

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As for a practical use of HTS power devices, AC loss reduction is still one of the main issues and expected to be achieved by making multi-filamentary conductor. An HTS layer of YBCO coated conductor may be divided into several narrow strips by striation, which could be realized by chemical etching or physical laser cut, led to a practical multi-filamentary HTS conductor for power devices. However, just simple striations could cause a lack of uniform distribution of transport current, so a careful measurement of current flows through filaments of the striated coated conductor is indispensable. This paper presents a method of noncontact measurement of current flows in each filaments of YBCO coated conductor under AC current conditions. We've already suggested a similar measurement system by using an array of Hall sensors, but most of Hall sensors do not show a stable performance at low temperature such as boiling temperature of liquid nitrogen, so we substituted search coils for Hall array. Several striated YBCO coated conductors and very small array of search coils were prepared to show the effectiveness of this noncontact measurement method without damaging the sample. A measurement error by misalignment of installation should be removed, so we also proposed a compensation technique to improve the accuracy of the measurement.

keywords : striation, search coil, current distribution

Acknowledgement

This research was supported by a grant from Center for Applied Superconductivity Technology of the 21st Century Frontier R&D Program funded by the Ministry of Education, Science and Technology, Republic of Korea.