



Contribution ID: 527 Contribution code: THU-PO3-612-07

Type: Poster

Pulsed field magnetization of GdBaCuO superconducting bulks with high magnetization efficiency using a split type coil with a soft iron yoke

Thursday, 18 November 2021 10:00 (20 minutes)

Single-grain REBaCuO superconducting bulks have significant potential as a trapped field magnet (TFM) because they can trap a magnetic field, BT , over several tesla. To enhance the BT value, reliable seeding methods for the fabrication of REBaCuO bulks is essential to increase critical current density, J_c . The top-seeded melt growth (TSMG) technique is a well-known growth method to fabricate large single grains [1]. The top-seeded infiltration growth (TSIG) technique is also a reliable, alternative growth method, which has shown the potential to provide a more homogeneous microstructure and improved J_c properties compared with TSMG bulks. [1]. In a previous study, we performed the pulsed field magnetization of YBaCuO bulks prepared by TSMG and TSIG using a solenoid coil, for which the TSIG bulks achieved a BT over 2 T at $T_s = 40$ K by single-pulse PFM due to a reduced temperature rise [1]. In addition to this, a split coil with a soft iron yoke can potentially achieve higher trapped fields in TSIG bulks as required for a wide range of applications [2].

In the present work, we performed PFM experiments on GdBaCuO superconducting bulks prepared by TSMG and TSIG using a split coil. A maximum trapped field, BT_{max} , over 3.5 T was achieved at $T_s = 40$ K on the TSIG bulk surface by single-pulse PFM. The magnetization efficiency ($= BT_{max} / B_{app}$) for the TSIG bulks was higher than that of the TSMG bulks, where B_{app} is the applied field when the maximum trapped field was achieved. The differences in the magnetization properties are discussed including critical current density, J_c (H), and field cooled magnetization (FCM) measurements.

[1] D. K. Namburi *et al.*, Supercond. Sci. Technol. **33** (2020) 115012

[2] M. D. Ainslie *et al.*, Supercond. Sci. Technol. **29** (2016) 074003

Primary author: SHINDEN, Motoki (Iwate University)

Co-authors: Dr NAMBURI, Devendra (University of Cambridge); Dr TAKAHASHI, Keita (Iwate University); Prof. FUJISHIRO, Hiroyuki (Iwate University); Dr AINSLIE, Mark (University of Cambridge)

Presenter: SHINDEN, Motoki (Iwate University)

Session Classification: THU-PO3-612 Bulk Magnets