

Field trapping property of HTS bulk magnet with reduced voids in pulsed field magnetizing process *

Tetsuo Oka^a, Hiroataka Seki^a, Daichi Ishiduka^a, Jun Ogawa^a, Satoshi Fukui^a, Takao Sato^a, Kazuya Yokoyama^b, and Akira Murakami^c

^aNiigata University, 2-8050, Ikarashi, Niigata 950-2181 Japan

^bAshikaga Institute of Technology, 268-1 Ohmae-cho, Ashikaga, Tochigi, 326-8558 Japan

^cIchinoseki National College of Technology, Takanashi, Hagisho, Ichinoseki 021-8511, Japan

The field-trapping ability of melt-textured bulk superconductors is usually restricted by the mechanical properties because of the magnetic stress induced in the samples during the activation processes which give them intense magnetic fields of several T. Therefore it is of crucial importance to enhance the toughness of materials by means of reinforcing techniques. In this experiment, we adopted a dense Dy-based HTS bulk sample fabricated by means of controlling the concentration of voids inside it during the heat treatment. The single and iterative magnetic pulsed fields up to 7.66 T have been applied in the temperature range down to 31 K with use of GM refrigerator, and the profiles of pulsed fields and the resultant trapped fields are discussed with respect to their performances and distributions. It was found that the trapped field grows as expanding rise time of the pulsed field and lowering initial temperature, and that the trapped field distribution after the former pulsed field application strongly affects to the resultant trapped field of the sample.

*Supported by NSF under grant DMR-0819860.