



Tetsuo OKA, Dr. Eng

Professor

Program: Electrical and Information Engineering

Area: Electrical and Electronic Engineering

Education Center for Advanced Engineering and
Technology, Faculty of Engineering

Professional Expertise

His professional expertise is specialized in the studies on various applications of the high temperature superconductors (HTS) to strong magnetic field generators, magnetic separation techniques, sputtering devices, motors for electrical vehicles and so on. His group has been investigating on the magnetic flux behaviors applied from outside of HTS bulk materials by means of the pulsed field or static field magnetization techniques.

Research Fields of Interest

1. Fabrication methods for HTS bulk materials
 - Mechanical properties of Ag-doped Y-Ba-Cu-O materials
 - Field-trapping ability of melt-processed large grain bulk superconductors
2. Analysis and development for magnetization techniques for bulk magnets
 - Thermal behaviors of the magnetic flux during the pulsed-field magnetization
 - Performances of trapped field magnet activated by static magnetic fields
3. High temperature superconducting bulk magnet systems
 - Construction of various magnetic field generators using HTS bulk materials
4. Industrial application of high temperature superconducting bulk magnets
 - Development of the magnetic separation techniques for waste emulsion water
 - Novel magnetizing techniques for rare earth magnets
 - Small-sized superconducting electrical motor for automobiles

Education

1992: Doctoral Eng. degree, School of Engineering, Nagoya University, Japan

1979: Bachelor Eng. degree, Graduated from Dept. of Metallurgy, Kyoto University, Japan

Professional Societies and Activities

1. Cryogenic Association of Japan
2. The Institute of Electrical Engineers of Japan
3. The Japan Society of Mechanical Engineers
4. The Japan Institute of Metals
5. Japanese Society for Engineering Education

Awards

1. “Performances of compact magnetic field generators using cryo-cooled high temperature bulk superconductors as quasi-permanent magnets”, Superconductor Science and Technology 20 (2007) pp. 1233-1238, selected to the Highlighted Article in Feb. 2008.
2. Poster presentation award by Cryogenic Association of Japan, “Waste Water Purification by High Gradient Magnetic Separation Using HTS Bulk Magnet System”, May 2008.
3. “Higher Trapped field over 5 T on HTSC bulk by modified pulse field magnetizing”, Physica C: Superconductivity and its Applications Top Cited Article 2005-2010 Physica C: Superconductivity and its Applications, Vol. 445-448, 2006.
4. “Study on quasi permanent magnets of high temperature bulk superconducting materials and pulsed field magnetization technique”, Technology development award by The Society of Non-traditional Technology, April 1999.
5. “Quasi permanent magnets of high temperature superconductors and the application to superconducting motor”, Paper award by The Japan Institute of Metals, September 1998.

Major Publications

Papers and International Conferences

- [1] “Preferential Magnetic Flux Invasion and Heat Generation Owing to Macrostructure in HTS Bulk Magnets in Pulse Field Magnetization Processes”, IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY, vol.25, Issue3, part 3, pp.6800904,ISSN1051-8223,doi:10.1109/TASC.2014.2373653, 2015
- [2] “Collection of Ni-Bearing Material from Electroless Plating Waste by Magnetic Separation with HTS Bulk Magnet”, PhysicaC,no.496,pp.58-62,2014
- [3] “Magnetic separation technique using high temperature superconducting bulk magnets and application to plating liquid waste treatment”, J. Jpn. Soc. Powder Metallurgy, vol.61, no.S1, pp.S164-166, 2014
- [4] “Magnetic Field-Trapping Properties of Melt-Processed RE123 Bulk Superconductors Activated by Pulsed-Field Magnetizing Method”, Transactions of the Materials Research Society of Japan, vol.38, no.2, pp. 273-277,2013
- [5] “Magnetic and thermal properties of HTS bulk magnet with reduced voids in the pulsed-field magnetizing process”, Journal of Superconductivity and Novel Magnetism: vol.26, no. 4,pp. 1301-1306,2013
- [6] “Flux-Invading Behaviors and Temperature Changes in Dy123 Bulk Magnet in Iterative Pulse Field Magnetization Process”, Physica C, no.494, pp.46-49, 2013.
- [7] “Magnetizing of Permanent Magnets Using HTS Bulk Magnets”, Cryogenics vol.52, pp.27-31,2012
- [8] “Magnetic separation technique for environmental water purification by strong magnetic field generator loading HTS bulk magnets”, Physica C, no.470, pp.799-1803,2010
- [9] “Thermal and Magnetic Behaviors of Melt-Textured Superconducting Bulk Magnet in Zero-Field Cooling Magnetizing Process”, Supercond. Sci. Technol, vol.22, no. 065014, pp.8,2009
- [10] “Processing and Applications of Bulk HTSC” , Physica C, Vol.463-465 , pp. 7-13,2007