

hysteresis motors and synchronous machines with "trapped magnetic flux". Depending on a thickness, quantity of BSCCO layers and filling factor they were produced the thin and thick one.

Several small-scale experimental models of above-mentioned types were developed and tested in the liquid nitrogen. The output power rating of reluctance motors with thin and thick HTS elements are respectively 3 kW and 4 kW. "Trapped field" machine was tested in generating mode for open circuit regime. The value of obtained magnetic flux density in the air gap is 0.8 T.

H4.1-08

SUPERCONDUCTING JOINING OF MELT-TEXTURED YBCO

Prikhna, Tetyana, Ukraine

Gawalek, Wolfgang, Germany

Moshchil, Viktor, Ukraine

Surzhenko, Alexey, Germany

Kordyuk, Alexandr, Ukraine

Litzkendorf, Doris, Germany

Melnikov, Vladimir, Ukraine

Alexandrova, Ludmila, Ukraine

Dub, Sergey, Ukraine

Koval, Alexander, Ukraine

Sergienko, Nina, Ukraine

Bokoch, Sergey, Ukraine

Vlasenko, Andrey, Ukraine

The existing technologies of MT-YBCO production do not allow yet large enough high-quality and complex-shaped parts to be produced that retard the HTS large-scale application and further development of HTS devices. We succeeded in obtaining SC joining between MT-YBCO parts with the properties comparable to those of melt-textured material (critical current density of about 12 kA/sq.cm at 77 K in the self-field) when the Tm123 powder was used as the solder. The seam with high superconductive and mechanical properties was possible to form if the speed of cooling was even much higher (about 50 K/h) than that of melt-texturing (0.5 K/h). But too high speeds of cooling or heating led to warping of MT-YBCO samples that causes a dramatic decrease in superconductive properties superconductive properties.

H4.1-09

Performance of Axial-Type Motor with Bi-2223 HTS Bulk Rotor

Muta, Itsuya, Japan

Muta, Itsuya, Japan

Jung, Hunjune, Japan

Hirata, Tomohiro, Japan

Hoshino, Tsutomu, Japan

An axial type motor with Bi-2223 HTS bulk rotor is fabricated to investigate the possibility that a Bi-2223 HTS bulk applies to a motor. The axial type motor with Bi-2223 rotor has the same structure of a conventional axial gap type brushless DC motor used for FDD, VTR and so on. The HTS motor consists of three phase, two poles, and six coils per each of coil side. Armature coils are wound on laminated cores with the object of gaining large flux density in air gap. The HTS motor is immersed in liquid nitrogen for cooling the Bi-2223 HTS bulk rotor. The motor is tested with changing input voltage, air gap length and so on. A motor speed is not up to a synchronous speed. It is considered that harmonics of magnetic field and magnetic characteristics of Bi-2223 affect the torque development. It is investigated the relation among input voltage, slip and motor parameters (resistance, reactance, and power factor), so as to understand the

characteristics of the HTS motor against slip. Also zero field and field cooling test results are compared. From the experimental result, the effect of the magnetic field on the axial type motor with Bi-2223 HTS bulk rotor has been investigated.

H4.1-11

Superconducting welding agents based on Ag for YBCO system

Iliescu, Simona, Spain

Carrillo, Anna Esther, Spain

Puig, Teresa, Spain

Obradors, Xavier, Spain

The welding of two or more large single domains of melt textured high T_c superconductors of type REBa₂Cu₃O_{7-x} brought a great excitement in the field of superconductivity. The technical requirement of the superconducting joints is to have high critical currents which will be able to generate large magnetic fields for use in engineering applications such as magnetic bearings, fly-wheel energy storage systems, motors and fault current limiters. In this paper we report on new welding agents based on silver, i.e. silver thin foil, silver oxide powder and YBCO-Ag composites, which have a lower peritectic temperature than YBa₂Cu₃O_{7-x}. It will be shown that under controlled thermal treatment the silver particles are confined in the immediate welding zone. The weld joint is mechanically strong and depends on the density of the material. We will present a comparison of the quality of the different welding for the YBCO system.

The microstructure of the weld joint has been evaluated by scanning electronic microscopy and polarised optical microscopy. The magnetic properties have been evaluated with measurements of inductive critical currents.

We will show that welding agents based on Ag can improve the microstructure, reducing the microcracks and the porosity and they also avoid macrosegregation of secondary phases. The technique appears than very promising for developing large superconducting tiles.

H4.1-13

Temperature Characteristic of Rotor of HTS Synchronous Rotary Machine cooled by Solid Nitrogen

Jo, Young-sik, Korea

Hong, Jung-pyo, Korea

Lee, Ju, Korea

Sohn, Myoung-hwan, Korea

Kwon, Young-kil, Korea

Ryu, Kang-sik, Korea

This paper deals with cryogen, which is used as solid nitrogen to keep the operating temperature of High Temperature Superconducting (HTS) synchronous rotary machine. To make the liquid nitrogen of solid one, liquid helium (LHe) passes into the heat exchanger and cools its own temperature. Two types of heat exchangers are designed and manufactured to make the solid nitrogen, and each of the temperature characteristics is compared. The rotor of HTS synchronous rotary machine is cooled by latent heat of solid nitrogen and it is kept under 40K for 2 hours and 30 minutes without LHe.