

26th National Symposium on Cryogenics and Superconductivity

Contribution ID : 86

Development of a lab-scale YBCO based High-Tc Superconducting Power cable

Friday 24 Feb 2017 at 12:45 (00h15')

Content :

Since the discovery of High Tc Superconductivity in 1986, the technology of High Tc Superconducting (HTS) power cables is getting developed all over the world in a continuous manner for efficient transfer of electrical energy in power transmission. In view of the benefits that can be obtained from usage of HTS cables in future power transmission systems, Applied Superconductivity Laboratory, IIT Kharagpur, in collaboration with Central Power Research Institute (CPRI), Bangalore has developed a 1m. long lab-scale superconducting cable carrying 1 kA current at low voltages (~10 volts) without any joule heating. Further, for testing the HTS cable under cryogenic conditions, a flexible co-axial cryostat made out of double walled SS bellows with super-insulation, vacuum in the space between the walls and suitable end-connectors are fabricated. The HTS cable containing 2G YBCO HTS tapes (of width around 4 mm and thickness of 0.1 mm) as current carrying conductors, wound helically around a copper former is tested for superconductivity upto 800 Amps current in an open liquid nitrogen bath-type cryostat using an AC power supply (0-1500 Amps AC) and necessary measuring instruments (nano voltmeter, temperature controller). In the present paper, the Voltage – Current characteristic of the HTS cable along with its detailed development procedure is presented.

Primary authors : Mr. THADELA, Sudheer (Applied Superconductivity Laboratory, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur, West Bengal - 721302, India)

Co-authors : Dr. B, Nageshwar Rao (Central Power Research Institute, Bangalore - 560080, India) ; Dr. J, Sundara Rajan (Central Power Research Institute, Bangalore - 560080, India) ; Prof. V V, Rao (Applied Superconductivity Laboratory, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur, West Bengal - 721302, India)

Presenter : Mr. THADELA, Sudheer (Applied Superconductivity Laboratory, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur, West Bengal - 721302, India)

Session classification : Technical Session 10

Track classification : Electrical and Power Applications

Type : Contributory Talk