MT25 Conference 2017 - Timetable, Abstracts, Orals and Posters



Contribution ID: 567

Type: Poster Presentation of 1h45m

A Study on Thermal and Electrical Characteristic of Metallic Cladding GdBCO Coil

Wednesday 30 August 2017 13:15 (1h 45m)

A no-insulation (NI) winding technique has been utilized in high-temperature superconducting (HTS) coils owing to enhanced thermal and electrical stabilities as well as high mechanical strength. However, the chargedischarge rate of the NI coil is considerably slower than that of completely insulated coils. Although metalinsulation (MI) and partial-insulation (PI) winding techniques have been suggested to ameliorate the slow charge-discharge rate of the NI coil, the current density of MI coils and mechanical strength of PI coils are respectively lower than those of their NI counterparts. Therefore, a metallic cladding (MC) winding technique that utilizes the HTS tape employing a μ m-thick metallic cladding layer has recently been developed to resolve the drawbacks of the PI and MI coils. In this study, we examined the charge-discharge rate and thermal/electrical stabilities of the MC GdBCO coil through charge-discharge, sudden discharge and over-current tests. Based on the test results, we discussed the feasibility of the MC winding technique to obtain a thermally stable and mechanically robust HTS magnet with an enhanced overall current density.

Acknowledgement: This work was supported by the Materials and Components Technology Development Program of KEIT [10053590, Development of MgB2 wire and coil with a high critical current and long length for superconducting medical-electric power equipment] and in part by the Korea Basic Science Institute under Grant D37614.

Submitters Country

Republic of Korea

Authors: Mr KIM, Jimin (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Prof. LEE, Haigun (Department of Materials Science and Engineering, Korea University, Seoul, Korea)

Co-authors: Dr KIM, Jong Cheol (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Mr KIM, Young-Gyun (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Ms SON, Hyun Hee (Department of Materials Science and Engineering, Korea University, Seoul, Korea); Mr HYEON, Chang Ju (Jeju National University); Prof. KIM, Ho Min (Department of Electrical Engineering, Jeju National University, Jeju, Korea)

Presenter: Mr KIM, Jimin (Department of Materials Science and Engineering, Korea University, Seoul, Korea)

Session Classification: Wed-Af-Po3.11

Track Classification: G3 - Stability of Conductors and Coils