



Contribution ID: 346 Contribution code: TUE-PO1-609-11

Type: Poster

## The Study on Quench properties of 2G HTS coils using the tapes by Holing and Hole filling process

*Tuesday, 16 November 2021 13:15 (20 minutes)*

Since the 2G HTS tapes are made by a multi-layered thin film process, delamination occurs easily when stress is applied in the vertical direction of the tape. That is, in the cooling process of the superconducting coil, delaminations occur in the multi-layered HTS tapes when the stress value due to the difference in the thermal contraction rate of each material constituting the HTS tape is greater than the bonding strength of the superconducting layer. The same problem arises in the hoop stress that occurs in the superconducting coil. When delamination occurs, the characteristics of the superconducting tape are deteriorated. To improve this problem, we developed a 'holing and hole filling process' in which holes are processed using a laser in the vertical direction of a HTS tape and then filled with metal such as copper or solder. The metal substrate is evaporated by the heat of the laser, and the evaporated metal is coated on the hole wall that is to fix the superconducting layer. The hole walls coated with metal prevents delamination of HTS tapes. In this study, it is suggested that not only the mechanical properties of HTS tapes can be improved by the holing and hole filling process, but also the electromagnetic properties of the coil can be improved. The current distribution and heat flow around the artificially made hole were calculated, and the effect on the stability of the superconducting coil was investigated. It can be seen that the magnetic field decreases faster than the metal-insulation coil because of the rapid current distribution after quenching at hole and hole filling processed coil.

**Primary authors:** HA, Dong-Woo (Korea Electrotechnology Research Institute); KO, Rock Kil (Korea Electrotechnology Research Institute); NOH, Hyun-Woo (Korea Electric Research Institute); Mr KOO, Tae-Hyung

**Presenter:** HA, Dong-Woo (Korea Electrotechnology Research Institute)

**Session Classification:** TUE-PO1-609 Stability and Mechanical Properties