Contribution ID: **273** Contribution code: **TUE-OR1-602-04** Type: **Oral**

Report on the Improvement of In-field Critical Current in SuNAM's Coated Conductor

Tuesday, 16 November 2021 10:45 (15 minutes)

At SuNAM, we set up a new RCE-DR(Reactive Co-Evaporation –Deposition and Reaction) system employing a 100 kW electron-gun for superconducting layer deposition. Using the new system, with higher power and enhanced beam stability, we co-evaporated APC generating materials such as Hf and Zr. We also tried rare earth(RE) elements other than currently used Gd, and mixtures of REs to get enhanced pinning. We observed increase of I_C in mid-temperature(20~40 K) and mid-field(< 5 T) range, and are in the process of further optimization for higher fields.

Improved e-beam stability and beam controllability let us make more uniform tapes in our conventional formula for electric power applications such as cables, and fault current limiters. These features, together with higher deposition rates enabled by more powerful e-gun let us well positioned for new cable projects in Korea following the 1st commercial installation a couple of years ago.

We had also developed high field magnets with the center field higher than 20 Tesla, and also tested various cable designs mainly based on stacked-tape type with a plan to applying them in our magnet manufacturing. In this conference, the recent activities and achievements in SuNAM will be presented.

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Session Classification: TUE-OR1-602 High Tc Wires and Cables I