

Recent progress on SuNAM's Coated Conductor Development; Performance, Price & Utilizing Ways

Seung-Hyun Moon, Jae-Hun Lee, and Hunju Lee

SuNAM Co.,Ltd., Anseong,Gyeonggi, 17554,Korea

Email: smoon@i-sunam.com

Abstract — SuNAM has been producing long-length coated conductors based on a proprietary process which consists of a co-evaporation of constituent metals and the subsequent conversion of the precursor film to the superconducting phase in a carefully controlled temperature and oxygen pressure environment (Reactive Co-Evaporation by Deposition & Reaction, RCE-DR). To secure a stable manufacturing routine for hundred-meter-long wires with a high uniformity in critical currents, we employed various quality control measures. We'll describe the quality control and inspection methods, including recently developed defect classification from remnant field profile analysis. We tried to further increase the critical current above 800 A/cm-width. This goal should be achieved by increasing thickness of superconducting layer while retaining the critical current density, or even enhancing it without compromising critical current uniformity. To do this, we varied the co-evaporation process to enhance the composition uniformity, and also modified the temperature and pressure profile in the heat treatment furnace to better utilize the conversion dynamics of the GdBaCuO phase formation, and the results will be presented. Tapes made by RCE-DR typically showed a relatively weak pinning, presumably due to the very fast conversion speed, which has been the most challenging problem. In order to overcome this problem, we have tried to refine the Gd₂O₃ particles trapped in the GdBCO matrix by varying the composition. In this talk, detailed pinning effects of these pinning centers and a modified phase diagram for the non-stoichiometric case will be presented.

Acknowledgement:

This work was supported by the Korea Institute of Energy Technology Evaluation and Planning (KETEP) and the Ministry of Trade, Industry & Energy (MOTIE) of the Republic of Korea (No. 20131010501800).

Keywords, Index Terms — GdBaCuO coated conductors, RCE-DR (Reactive Co-Evaporation by Deposition & Reaction) process, long-length processing, in-line quality control, metal-clad insulation (MCI)

IEEE/CSC & ESAS SUPERCONDUCTIVITY NEWS FORUM (global edition), October 2016.

Submitted October 19, 2016; Selected October 22, 2016. Reference STP528; Category 5.

CCA 2016 Invited presentation IO-16.