이축 배향화된 전도성 복합 산화물의 금속 기판의 제조와 분석
Fabrication and Characterization of Bi-axial Textured Conductive Perovskite-type Oxide Deposited on Metal Substrates for Coated Conductor.

Sooyeon Han, Jongin Hong, Youngah Jeon, Huyong Tian, Yangsoo Kim, Kwangsoo No
Electronic & Optical Materials Lab., Department of Material Science and Engineering, Korea Advanced Institute of Science and Technology, Korea
(han0401@kaist.ac.kr)

Abstract
The development of a buffer layer is an important issue for the second -generation wire, YBCO coated metal wire. The buffer layer demands not only on the prohibition of the reaction between YBCO and metal substrate, but also the proper lattice match and conductivity for high critical current density (Jc) of YBCO superconductor. In order to satisfy these demands, we suggested CaRuO3 as a useful candidate having that the lattice mismatches with Ni (200) and with YBCO are 8.2% and 8.0%, respectively.
The CaRuO3 thin films were deposited on Ni substrates using various methods, such as e-beam evaporation and DC and RF magnetron sputtering. These films were investigated using SEM, XRD, pole-figure and AES. In e-beam evaporation, the deposition temperature of CaRuO3 was the most important since both bi-axial texturing and NiO formation between Ni and CaRuO3 depended on it. Also, the oxygen flow rate had an effect on the growth of CaRuO3 on Ni substrates. The optimal conditions of crystal growth and film uniformity were 400'C, 50 mA and 7 kV when oxygen flow rate was 70~100sccm. In RF magnetron sputtering, CaRuO3 was deposited on Ni substrates with various conditions and annealing temperatures. As a result, the conductivity of CaRuO3 thin films was dependent on CaRuO3 layer thickness and fabrication temperature. We suggested the multi-step deposition, such as two-step deposition with different temperature, to prohibit the NiO formation and to control the bi-axial texture.