

Deposition of YBCO/BaZrO₃ Films on MgO by Pulsed Laser Deposition

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There are two major approaches to obtain texture template for HTS coated conductor (CC) --- IBAD and RABiTS. CC's with IBAD template showed both longer and higher I_c results so far. IBAD for CC began with YSZ, the processing of which is very slow compared to other processings needed for the fabrication of CC. Because of this very slow processing speed, IBAD with other materials such as Gd₂Zr₂O₇(GZO) and MgO have been developed. The processing speeds of IBAD-GZO and IBAD-MgO are known to be up to 3 times and 100 times, respectively, as fast as the processing of IBAD-YSZ. IBAD-MgO is very attractive in that the processing is very fast. IBAD-MgO also needs additional buffer layer(s). Many materials are being investigated to be used as a buffer layer on top of the MgO. BaZrO₃ (BZO) is a good candidate as the buffer layer on top of the IBAD-MgO because it is chemically stable and does not react with YBCO at high temperatures. It also has good lattice match with MgO. The BZO film has been deposited on single crystal MgO, and YBCO film was deposited on BZO/MgO to investigate the possibility of using BZO as both the buffer and capping layer of the CC. All the films were deposited using pulsed laser deposition, and the results of texture analysis and superconducting properties will be presented.

keywords : BaZrO₃, YBCO, coated conductor, IBAD, buffer layer, PLD

Acknowledgement

This research was supported by a grant from Center for Applied Superconductivity Technology of the 21st Century Frontier R&D Program funded by the Ministry of Science and Technology, Republic of Korea.