

High Speed Deposition Technique of YSZ Film for the Superconducting Tape

Ho-Sup Kim*, Dongqui Shi, Jun-Ki Chung, Hong-Soo Ha, Rock-Kil Ko,
Soo-Jeong Choi, Yu-Mi Park, Kyu-Jeong Song, Do-Jun Youm^a, Chan Park

Korea Electrotechnology Research Institute

^a *Korea Advanced Institute Science and Technology*

High temperature superconducting coated conductor has a structure of <protecting layer>/<superconducting layer>/<buffer layer>/<metallic substrate>. The buffer layer consists of multi-layer, and the architecture most widely used in RABiTS approach is CeO₂(cap layer)/YSZ(diffusion barrier layer)/CeO₂(seed layer). Evaporation technique is used for the CeO₂ layer and DC reactive sputtering technique is used for the YSZ layer. A chamber was set up specially for DC reactive sputtering. Detailed features are as following. A separator divided the chamber into two halves --- a sputtering chamber and a reaction chamber. The argon gas for sputtering target elements flows out of the cap of sputtering gun, and water vapor for reaction with depositing species spouts near the substrate. Turbo pump is connected with reaction chamber. High speed deposition of YSZ film could be achieved in the chamber. Detailed deposition conditions (temperature and partial pressure of reaction gas) were investigated for the rapid growth of high quality YSZ film.

keywords : YSZ, DC reactive sputtering, coated conductor, buffer layer

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