

SmBCO Coated Conductor Deposition using CeO₂ Single Buffer Layer by Reactive Evaporation

T.H.Kim*, H.S.Kim^a, S.S.Oh^a, J.S.Yang^a, R.K.Ko^a, D.W.Ha^a, K.J.Song^a, H.S.Ha^a,
K.C.Pa^b, S.H.Cho^b, K.D.Jung^c

^a Korea Electrotechnology Research institute, Changwon, Korea.

^b Kyungpook national university, Daegu, Korea.

^c KISWIRE Co. Ltd., Pohang, Korea.

High temperature superconducting coated conductors have multi-layered buffers consisting of seed, diffusion barrier and cap layers. This multi-buffer layer deposition requires longer fabrication time. This is one of main reasons, which increases fabrication cost. Thus, single buffer layer deposition seems to be important for practical coated conductor process.

In this study, thermal evaporation technique using induction heat was employed to deposit CeO₂ single buffer on textured Ni-5%W substrate. Detailed deposition conditions (temperature and partial gas pressure of deposition) were investigated for the rapid growth of high quality CeO₂ film and its critical thickness as a diffusion barrier. SmBCO superconducting layer was deposited by co-evaporation process.

The depth profile of SmBCO/CeO₂/Ni-5%W was analyzed. The superconducting properties of SmBCO deposited on the template of CeO₂/Ni-5%W were measured and discussed in terms of CeO₂ film quality.

Keywords : reactive evaporation, single buffer, co-evaporation, CeO₂