

R&D Status and Prospect of HTS Coated Conductor in DAPAS Project

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In a near future, HTS coated conductor(CC) is believed to replace 1st generation PIT wires which are used in prototypes of superconducting electric equipments such as motors, power cables and SFCL because of its excellent cost -performance(C/P) of \$/kA-m. A lot of R&D efforts are carried out for the development of high performance CC wire throughout the world. In Korea, we have developed CC wires by various methods in DAPAS project. MOD and PVD were selected as main processes for the deposition of superconducting layer. KERI is currently concentrating on the development of long CC wire by PVD process. In a short sample of Y₂O₃-YSZ-CeO₂(YYC)/YBCO layer structure, which was started from a textured Ni-W substrate tape and processed by reactive DC sputtering for YY buffers, PLD for CeO₂ cap layer and PLD for YBCO layer, critical current of 180 A/cm-w at 77 K and self field was obtained by multiple PLD passes. On the other hand, I_c of 51 A/cm-w was obtained for 10 m-long CC tape which was deposited by reel-to-reel PLD process.

EDDC (Evaporation using Drum in Dual Chamber) process which was firstly developed in KAIST is considered to be one of very effective methods to produce long CC wires. High deposition speed and wider window of deposition condition for SmBCO in EDDC process are big advantages from a view point of commercialization of CC wire. EDDC system for 100 m-long CC wire was manufactured recently and now is being modified. We strongly believe that C/P can be greatly reduced by a modified EDDC process.

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