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The effect of compositional ratio of SmBCO coated conductor on the superconducting properties.

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Sm_{1-x}Ba₂Cu_{3-y}O_{7-d} (SmBCO) coated conductors were fabricated by reactive co-evaporation method in the EDDC (Evaporation using Drum in Dual Chambers) deposition chamber. The structure of SmBCO coated conductor was Ag/SmBCO/LMO/MgO/Y₂O₃/Al₂O₃/Hastelloy. The deposition system was composed of dual chambers: reaction chamber and evaporation chamber. Superconducting materials of Sm, Ba, and Cu were evaporated in the evaporation chamber and deposited on the substrate mounted on the drum while the deposited elements reacted with oxygen and turned into SmBCO superconducting phase in the reaction chamber. The samples with different composition ratios were prepared, and we measured the angular dependence of critical current under high magnetic field and the field dependence of critical current. We found out that the magnetic field dependence of critical current was highly dependent on the composition ratio of SmBCO film. The broad peak at $\Theta = 0$ (B//c-axis) in the angular dependency of critical current was observed, which means that c-axis co-related pinning center was formed in SmBCO film. The elemental mapping of the high-J_c SmBCO coated conductor was measured by TEM-EDX. We confirmed secondary phases and Sm/Ba anti-site phase which take the role of pinning centers.

Submitters Country

KOREA

Author: Mr KIM, Gwan-tae (Korea Electrotechnology Research Institute)

Co-authors: Dr KIM, Ho-sup (Korea Electrotechnology Research Institute); Dr HA, Dong-woo (Korea Electrotechnology Research Institute); Mr KO, Rock-kil (Korea Electrotechnology Research Institute)

Presenter: Mr KIM, Gwan-tae (Korea Electrotechnology Research Institute)

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