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Wed-Af-Po3.18-07 [43]: The study of pinning center formation in Sm1Ba2Cu3O7-d coated conductor by reactive-co evaporation method

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We investigated the pinning centers formation in Sm1Ba2Cu3O7-d(SmBCO) coated conductor by reactive co evaporation method. The SmBCO film was deposited on the IBAD-MgO template with the structure of SmBCO/LMO/MgO/Y2O3/Al2O3/Hastelloy using EDDC (Evaporation Using Drum in Dual Chambers) process. We investigated the phase formations as pinning centers with the change of composition ratio of Sm:Ba:Cu. We found out that several phases were observed in the SmBCO matrix such as Sm2O3 and Sm/Ba anti-site when compositional ratio of Sm:Ba:Cu=1+x:2:3, which was confirmed by TEM analysis, and good superconducting properties under high magnetic field could be achieved by virtue of those pinning centers. We also investigated the effect of deposition process parameters such as deposition rate and temperature on the pinning centers formations. As the deposition rate of SmBCO was increased, point shaped pinning centers were dominant, on the other hand, as it was decreased, rod shaped pinning centers were dominant. As substrate temperature was increased, rod shaped pinning centers were dominant, on the other hand, as it was decreased, particle shaped pinning centers were dominant. We could fabricate high performance of SmBCO superconducting coated conductor under high magnetic field with effective pinning centers.

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