MT 26
International Conference on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **772** Type: **Poster Presentation**

Wed-Af-Po3.18-06 [42]: Improvement of Jc properties for Hf and La doped Gd123 films fabricated by fluorine-free MOD method

Wednesday 25 September 2019 14:00 (2 hours)

We have fabricated Hf and La doped FF-MOD GdBa2Cu3Oy (Gd123) thin films on LaAlO3 substrates and investigated their flux pinning properties. Temperature dependence of Jc in magnetic fields parallel to the c-axis orientation up to 7 T was estimated from the width of the magnetization curves using the modified critical state model. Critical temperature for Gd123 thin films indicated around 92 K, and Tc varied little by Hf and La doping. Hf 10 mol% doped film achieved high critical current densities of 2.72 MA cm-2 at 77.3 K under 0 T, and 0.27 MA cm-2 at 77.3 K under 1 T. With increasing Hf doping amount, Fp gradually increased, and the peak of Fp shifted to the high magnetic field side. The elementary pinning force and the effective pinning center density also increased. The number of effective pins increases until Hf 2 mol%, and then it decreases a little. Especially Hf 2 mol% film obtained the maximum value of 49.8 μm-2 at 4.2 K, which is 2 times larger than that for non-doped film. We believe that BaHfO3 are introduced into FF-MOD Gd123 thin films by Hf doping. Furthermore, Gd123 thin films with La addition showed the increase of Jc at self-magnetic fields and the decrease in number of density of holes on the film surface. La 1 mol% and Hf 2 mol% co-doped film achieved high critical current densities of 3.10 MA cm-2 at 77.3 K under 0 T, and 0.32 MA cm-2 at 77.3 K under 1 T. It confirmed that the effective APCs were introduced by Hf doping to improve Fp in magnetic fields and promoting crystallization of Gd123 by La doping brought about the increase of Jc in low fields.

Authors: FUKUI, Joichiro (Electrical and Electronic Engineering, Tokyo Metropolitan University, Japan); Prof. MIURA, Osuke (Electrical and Electronic Engineering, Tokyo Metropolitan University, Japan); Prof. KITA, Ryusuke (Electrical and Electronic Engineering, Shizuoka University, Japan)

Presenter: FUKUI, Joichiro (Electrical and Electronic Engineering, Tokyo Metropolitan University, Japan)

Session Classification: Wed-Af-Po3.18 - REBCO Wires & Cables III