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M1Po3A-03: The Effect of Calcium Doped Y-Ba-Cu-O (CaY123) Layer Thickness on the Flux Pinning in (CaY123 / BaZrO3 Doped Y-Ba-Cu-O) Multilayer Composite Films at a Wide Range of Temperatures and Applied Fields

Monday 19 May 2025 14:00 (2 hours)

Past research has shown the significant impact of utilizing a calcium doped YBa2Cu3O7-x (YBCO) layer that separates three individual layers of 6 vol.% BaZrO3 (BZO) +YBCO multilayer composite films. Experimental evidence illustrated the ability of the calcium to diffuse and repair the defective interface existing between the BZO nanorods and the YBCO matrix. The composite films consisted of five total layers: three individual 50 nm layers of BZO doped YBCO interspersed by a 10 nm thick layer of calcium doped YBCO, Ca0.3Y0.7Ba2Cu3O7-x (CaY123). This research investigates any limits that may exist on the thickness of the calcium containing layers and the efficiency of the resulting interface repair, resulting in an increased flux pinning for the films. Films were produced via pulsed laser deposition with the CaY123 layer thickness varied from 1 nm, 2 nm, 5 nm, 10 nm, and 15 nm, while maintaining the BZO/YBCO individual layer thickness of 50 nm. Resulting magnetic current densities at 5 K–77 K and with field parallel to the c-direction at 0–9 T will be presented, along with microstructure analysis.

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