



Contribution ID: 842

Type: **Poster Presentation**

M2Po2B-04 [35]: Magnetization creep and decay of YBa₂Cu₃O_{7-x} thin films with columnar Y₂BaCuO₅ and BaZrO₃ pinning center additions

Tuesday, July 23, 2019 1:30 PM (2 hours)

Maximizing critical current density (J_c) and minimizing flux creep in high temperature superconductors (HTS) is critical for their inclusion in accelerator magnets where both high magnitude and high stability magnetic fields are required. In YBa₂Cu₃O_{7-x} (YBCO) thin films, critical current density can be enhanced by either the addition of many shallow pinning centers or the addition of fewer, deeper pins. In contrast, flux creep is better managed by the addition of deep pins. Pulsed laser deposition (PLD) was utilized to fabricate YBCO thin films on SrTiO₃ (STO) substrates with two different, non-reacting, and insulating phase additions: BaZrO₃ (BZO) and Y₂BaCuO₅ (Y₂11). Targets utilized in the PLD process consisted of YBCO doped with 2 vol. % BZO, and YBCO doped with 0, 5, 10, and 15 vol. % Y₂11. XRD and TEM characterization was performed. Magnetic J_c (B, T, μ_0) properties were determined. Additionally, the magnetic relaxation of the samples was measured at fields from 0-8 T and at temperatures of 4.2 to 77 K. The results of these measurements were used to generate $U(J)$ vs. J curves for each sample; fits were performed to extract an intrinsic pinning potential (U_0). These data were compared with high resolution XRD and TEM data on these uniquely hetero-structured YBCO films to elucidate structure-property relationships.

Primary authors: Mr MYERS, Cody (The Ohio State University); Dr SEBASTIAN, Mary Ann (UDRI & U.S. Air Force Research Laboratory); SUSNER, Michael (Air Force Research Laboratory)

Co-authors: HUANG, Jijie (Purdue University); Dr TSAI, Chen Fong (University of Purdue); WANG, Han (Purdue University); ZHANG, Di (Purdue University); Dr WANG, Haiyan (Purdue University); GAUTAM, Bibek (The University of Kansas); WU, Judy (University of Kansas); Dr SUMPTION, Michael (The Ohio State University); HAUGAN, Timothy (U.S. Air Force Research Laboratory)

Presenter: Dr SEBASTIAN, Mary Ann (UDRI & U.S. Air Force Research Laboratory)

Session Classification: M2Po2B - REBCO, Coated Conductor Processing