Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Enhancement of Critical Current Density of Yttrium Barium Copper Oxide (YBCO) Thin Films by Introducing Nano dimensional Cerium Oxide Defects TOCHUKWU EMEAKAROHA, RAHUL PONNAM , DHANANJAY KUMAR, ABEBE KEBEDE, FLOYD JAMES, North Carolina AT State University — In the application of high temperature superconductors (HTSC), the critical current density, Jc, is often the most important parameter in the design and engineering of practical devices. In this work we report the enhance the critical density of YBa2Cu3O7-x (YBCO) HTSC thin films by restraining the magnetic flux using self-assembled nano-structural defects. High density extended crystalline defects were introduced into c-axis oriented YBa2Cu3O7-x (YBCO) thin films, manufactured using pulsed laser deposition (PLD). These defects consist CeO2 of various densities determined by the number of laser pulses. The structural characterizations of YBCO/ CeO2 were carried out using x-ray diffraction (XRD) and scanning electron microscopy (SEM). Superconducting proprieties were measured using a vibrating sample magnetometer (VSM). The critical current density (Jc) of pure YBCO and CeO2 embedded YBCO films were calculated from magnetization (M) versus Field (H) loops using Bean's model. The critical current density shows significant enhancement and it is robust against applied field.

Abebe Kebede
North Carolina A
T State University

Date submitted: 10 Nov 2016 Electronic form version 1.4