

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Magnetic relaxation and critical currents of NdBCO coated conductors**<sup>1</sup> A.O. IJADUOLA, Dept. of Physics, Univ. of Tennessee, Knoxville, TN, S.H. WEE, A. GOYAL, J. LI, P.M. MARTIN, Oak Ridge National Lab., Oak Ridge TN, J.R. THOMPSON, Dept. of Physics, Univ. of Tennessee, Knoxville, TN and Oak Ridge National Lab., Oak Ridge, TN, D.K. CHRISTEN, Oak Ridge National Lab., Oak Ridge TN — A magnetic study of the critical current density  $J_c$  and magnetic relaxation ('creep') effects in thin  $\text{NdBa}_2\text{Cu}_3\text{O}_{7-\delta}$  (NdBCO) superconducting films of thicknesses 0.7 and 2.1  $\mu\text{m}$  was conducted. These films, doped with  $\text{BaZrO}_3$ , were deposited by a PLD process on 'IBAD' substrates. The  $J_c$  values display broad peaks near the c-axis. This is associated with densely spaced columnar defects distributed about this axis. We analyzed the magnetic relaxation data using the Maley expression for the activation energy  $U$  as a function of current density  $J$ . The data are described fairly well by the collective creep interpolation formula  $U = U_0 [(J_{c0}/J)^\mu - 1]$  with  $U_0$ ,  $J_{c0}$ , and  $\mu$  treated as fitting parameters.

<sup>1</sup>We thank Superpower Inc. for providing IBAD substrates. ORNL is managed by UT-Battelle, LLC for USDOE under contract DE-AC05-00OR22725.

Anota Ijaduola  
Univ. of Tennessee, Knoxville, TN

Date submitted: 06 Nov 2006

Electronic form version 1.4