Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Strain-controlled electronic properties and magnetorelaxor behaviors in electron-doped $CaMnO_3$ thin films and superlattices P.-H. XIANG, National Institute of Advanced Industrial Science and Technology (AIST) and Japan Science and Technology Agency (JST),CREST, H. YAMADA, A. SAWA, AIST, H. AKOH, AIST and JST, CREST — We present a systematic study on electronic properties of the *electron-doped* manganite $Ca_{1-x}Ce_xMnO_3$ (CCMO,0 $\leq x \leq 0.08$) single-layer films and superlattices composed of alternating stacks of non-doped $CaMnO_3$ (CMO) and CCMO($x = 0.08$) layers. The transport properties of the CCMO films are found to be very sensitive to the epitaxial strain. Metallic characteristic observed in the CCMO($0.04 \leq x \leq 0.06$) bulk polycrystal can be realized only in the practically strain-free CCMO epitaxial films on the $NdAlO_3$ (NAO) substrate. A large magnetoresistance accompanied with magnetorelaxor-like behavior is observed in the CCMO($x = 0.06$) film, which can be explained in terms of the phase separation and the irreversible growth of metallic domain in antiferromagnetic insulating matrix. The metallic property is also realized in the superlattices, indicating a charge transfer at the interfaces between CMO and CCMO($x = 0.08$) layers. When the CCMO($x = 0.08$) layer in the superlattice is thicker than 8 unit cells, the superlattice exhibits magnetorelaxor-like phenomenon This can be attributed to a phase competition between different antiferromagnetic orderings at the interfaces, resulting in the phase separation

Ping-Hua Xiang
National Institute of Advanced Industrial Science and Technology (AIST)
Japan Science and Technology Agency (JST), CREST

Date submitted: 01 Dec 2008 Electronic form version 1.4