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The role of the defects in the structural transitions in $NdNiO_3$ (NNO)/$GaNdO_3$ films[1] ZHEN WANG, Louisiana State Univ - Baton Rouge, SRIMANTA MIDDEY, Rutgers University, JING TAO, YIMEI ZHU, Brookhaven National Laboratory, JAK CHAKHALIAN, Rutgers University, JIANDI ZHANG, E.W. PLUMMER, Louisiana State Univ - Baton Rouge — The metal-insulator transition (MIT) in bulk NNO is observed to be associated with a structural phase transition. However, it was reported that the structural transition, probed by x-ray scattering techniques, is not necessary to in the MIT taking place in the NNO thin films. In order to the origin of the MIT in the NNO thin films, we employ the transmission electron microscopic (TEM) techniques to further characterize the crystal structures in real-space. Ruddlesden-Popper (R-P) planar faults are a special type of defects existing in many films. We found that the density of the R-P defects is different in the NNO thin films with distinct film thickness. Particular, few R-P defects were observed in the very thin NNO film (thickness ˜6 nm), while significant amount of R-P defects can be found in the film about 20 nm thick. Our structural observations clearly indicate that both the shift of A-site (Nb) ions positions and Ni-O-Ni tilt angles are suppressed near the R-P planar faults compared to the bulk NNO. More structural characterizations, such as the strain due to the substrate and elemental mapping at the interfaces/defects, will be discussed to demonstrate the possible mechanisms of the structural symmetry anomaly in the NNO thin films.

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