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Polar compensation in ultrathin films of a perovskite nickelate S. MIDDEY, P. RIVERO, D. MEYERS, M. KAREEV, X. LIU, Y. CAO, Department of Physics, University of Arkansas, Fayetteville, Arkansas 72701, USA, J.W. FREELAND, Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois 60439, USA, S. BARRAZA-LOPEZ, J. CHAKHALIAN, Department of Physics, University of Arkansas, Fayetteville, Arkansas 72701, USA — The effect of strong polarity mismatch at the heterointerface, grown along the pseudo cubic [111] direction between the correlated metal $LaNiO_3$ and band insulator SrTiO3 has been considered. While the metallic $LaNiO_3$ film can itself screen this polarity mismatch, additional reconstruction mechanisms are needed in ultrathin films which are insulating in nature. The reflection high energy electron diffraction patterns recorded during growth highlighted the evolution of nucleation of an additional phase during the first few unit cells of deposition, which are found to be oxygen deficient phase $LaNiO_{3-x}$ by x ray diffraction and x-ray resonant spectroscopy measurement. The amount of oxygen vacancies decreases ABRUPTLY with the increase of film thickness due to the increase electrical conductivity, which acts in a partial screening of the polar catastrophe.

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