

Abstract Submitted
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Polarization in Perovskite Manganites induced by Shear Stress¹ K. MIYANO, N. OGAWA, Y. IDA, R. TAMAKI, K. SHIMIZU, Y. NOMURA, R. ARITA, Univ. of Tokyo, Y. OGIMOTO, Univ. of Tokyo and Fuji Electr. Co. — We found static polarization in perovskite manganite films when they are under shear stress. The phenomenon is omnipresent in films deformed in (at least) monoclinic fashion due to the substrate-imposed strain, whereas it is absent in bulk crystals even though they are distorted in a similar manner in thermal equilibrium. The substrate stress of low symmetry is clearly the driving force for the appearance of the polarization. Optical second-harmonic generation (SHG) confirms the loss of inversion symmetry in strained films and pyroelectricity was detected in insulating films confirming the presence of the static polarization. DFT calculations show that the stable atomic positions in the experimentally observed structure is polar with the shift of the center of gravity of anions relative to that of cations as much as 10^{-2}\AA . The calculated polar structure is consistent with the symmetry obtained from the SHG polarimetry.

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