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Dielectric properties of perovskite oxynitride epitaxial thin films DAICHI OKA, YASUSHI HIROSE, HIDEYUKI KAMISAKA, TOMOTERU FUKUMURA, TETSUYA HASEGAWA, Department of Chemistry, School of Science, The University of Tokyo, SEIJI ITO, AKIRA MORITA, HIROYUKI MATSUZAKI, Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, KATSUYUKI FUKUTANI, Institute of Industrial Science, The University of Tokyo, SATOSHI ISHII, KIMIKAZU SASA, DAIICHIRO SEKIBA, Uiversity of Tsukuba Tandem Accelerator Complex (UTTAC) — Perovskite oxynitrides with the formula ABO_2N are expected to show unique electric properties hardly accessible by conventional oxides. For example, N-2p orbitals tend to form a shallow band at the top of the oxygen-nature valence band. This enables us to develop narrow-bandgap ferroelectric materials with d^0 configuration, which is applicable to ferroelectrics-based photovoltaic cells. In this study, we fabricated (001)-oriented epitaxial thin films of $SrTaO_2N$ by nitrogen-plasma assisted pulsed laser deposition on (Nb-doped) $SrTiO_3$ substrate. X-ray diffraction measurements revealed large lattice distortion (c/a of 1.015-1.03) due to compressive strain from substrate (mismatch of -3.2 %), though it is partially relaxed. The films had yellow color with a bandgap of about 600 nm. Ferroelectric behavior was observed at room temperature by piezoresponse force microscopy. As far as we know, this is the first experimental observation for ferroelectricity in perovskite oxynitrides. First principles calculations suggested that the ferroelectricity originates from *trans*-type nitrogen ordering, which can be driven by compressive strain.

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