

Abstract Submitted
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Raman Scattering in $\text{La}_{0.2}\text{Sr}_{0.8}\text{FeO}_{3-\delta}$ thin film: annealing-induced reduction and phase transformation¹ MOHAMMAD ISLAM, State University of New York at Oswego, YUJUN XIE, MARK SCAFETTA, STEVEN MAY, JONATHAN SPANIER, Drexel University — Raman scattering in thin film $\text{La}_{0.2}\text{Sr}_{0.8}\text{FeO}_{3-\delta}$ on $\text{MgO}(001)$ collected at 300 K following different stages of annealing at selected temperatures ($300 \text{ K} < T < 543 \text{ K}$, to 10 h.) and analysis reveal changes in spectral characteristics due to loss of oxygen, onset of oxygen vacancy-induced disorder, and activation of Raman-inactive modes that are attributed to symmetry transformation. The interpretation is further supported by carrier transport measurements under identical conditions showing orders of magnitude increase in the resistivity induced by oxygen loss. After prolonged annealing in air, evolution of the spectrum is consistent with the appearance of a topotactic transformation of the crystal structure from that of the rhombohedral ABO_3 perovskites to that of Brownmillerite-like structure consisting of octahedrally and tetrahedrally coordinated Fe atoms.

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