

Abstract Submitted
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Nonlinear optical probing of electric field induced oxygen migrations in Fe doped SrTiO₃¹ HAOCHEN YUAN, DAVID ASCIENZO, ONUR KURT, ZEHRA CEVHER, STEVE GREENBAUM, CUNY-Hunter Coll, RUSSELL MAIER, CLIVE RANDALL, the Pennsylvania State University, YUHANG REN, CUNY-Hunter Coll, CENTER FOR DIELECTRIC STUDIES, MATERIALS RESEARCH INSTITUTE TEAM — We report on our recent study of the electric field induced oxygen migration dynamics and defect states near the interface in Fe-doped SrTiO₃ single crystals by optical second harmonic generation (SHG) using a femtosecond Ti:sapphire laser at 800 nm wavelength. By varying both the incidence and the output angles, we identified a strong correlation between the measured SHG signals and the microscopic defect textures of the samples. Significant changes in SHG intensities and phases are explained by the formation and extension of oxygen vacancies and crystalline distortions near Fe defect centers. Our results show that the SHG technique is a powerful tool for detecting local environment near interfaces and oxygen migrations in ferroelectric structures.

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