

Abstract Submitted
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On the Role of Point Defects in the Persistent Photoconductivity of Strontium Titanate VIOLET POOLE, MATT MCCLUSKEY, Washington State University — Strontium titanate (STO) is a wide band gap transparent oxide semiconductor. STO often serves as a substrate for high temperature superconductors and is also used in oxygen sensors. STO was recently found to exhibit persistent photoconductivity (PPC) upon annealing, which means that the sample goes from insulating to conductive upon light exposure. The conductivity persists even after the light is turned off. As with any semiconductor, the electronic properties of STO are strongly affected by the presence of defects and impurities, which can be altered by annealing treatments. Oxygen vacancies have long been thought to be the dominant factor controlling the conductivity. However, hydrogen is usually present in oxide materials and can greatly influence the electronic properties. In this research, we investigate the roles hydrogen and oxygen vacancies play in the PPC behavior observed in STO. Spectroscopic methods in the visible and infrared regions of the electromagnetic spectrum were used to identify these elements and their behaviors under various conditions. We found that oxygen vacancies and hydrogen impurities appear to be important actors in this phenomenon. Refinements to the annealing procedure are suggested based on these results.

Violet Poole
Washington State University

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