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UV Induced Room Temperature Persistent Photocurrent in In₂O₃ Films RAGHAVA PANGULURI, A. DIXIT, C. SUDAKAR, P. KHAREL, PUSHKAL THAPA, Department of Physics and Astronomy, Wayne State University, Detroit, MI 48201, I.A. AVRUTSKY, Department of Electrical and Computer Engineering, Wayne State University, Detroit, MI 48201, ALEXANDER EFROS, Center for Computational Materials Science, Naval Research Laboratory, Washington DC 20375, R. NAIK, G. LAWES, B. NADGORNY, Department of Physics and Astronomy, Wayne State University, Detroit, MI 48201 — We have investigated the effects of UV irradiation on the electrical and optical properties of In₂O₃ thin films. These films were grown on sapphire substrate by RF sputtering. Hall effect measurements carried out to measure the carrier concentrations, n_c , show n-type conduction, with $n_c \sim 2 \times 10^{18} \text{ cm}^{-3}$. We find that UV illumination on In₂O₃ films leads to a dramatic increase in the charge carrier concentration, approximately one order of magnitude, and that these elevated carrier densities persist at room temperature on a timescale of days. Consequently, we observe distinct changes in the optical absorption spectra. Also, we studied the decay of the charge carrier density to the pre-illuminated state as a function of temperature. We will discuss possible mechanisms for persistent photoconductivity in these In₂O₃ thin films.

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