

Abstract Submitted
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All-Oxide Ga₂O₃-NiO_x PN Junction Diodes Enabled by Tunable Electrical and Optical Properties of Nickel Oxide (NiO_x) and Gallium Oxide (Ga₂O₃) Thin Films Deposited by Pulsed Laser Deposition at Room Temperature¹ MARIA ISABEL PINTOR MONROY, BAYRON LENNIN MURILLO-BORJAS, DIEGO BARRERA, JULIA W.P. HSU, Univ of Texas, Dallas, HUSAM N. ALSHAREEF, King Abdullah University of Science and Technology, MANUEL A. QUEVEDO-LOPEZ, Univ of Texas, Dallas — The need of stable, high quality electronic devices such as pn junctions, light-emitting diodes, transistors and UV photodetectors has pushed the development of both, p- and n-type, transparent semiconductor oxides. Thin films heterojunctions have been reported using ZnO and IGZO as n-type and NiO as p-type, with at least one metallic contact. Pulsed laser deposition (PLD) offers advantages over other deposition methods as more homogeneous, smoother surfaces with high reproducibility. In this work we present a new all-oxide heterojunction based in oxides deposited by PLD at room temperature without heat treatment. This heterojunction has low leakage current, an ideality factor close to 2, 10⁵ on/off ratio and acceptable on-voltage, with a wide band gap which makes it even more interesting for optoelectronics applications. Temperature dependence on the device performance is also discussed.

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