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Growth of ZnO Nanowire Arrays for Advanced Ultraviolet Detectors JOHN ZELLER, Magnolia Optical Technolgies, Inc., TARIQ MANZUR, Naval Undersea Warfare Center, 1176 Howell Street, Newport, RI 02841, A.F. MEHDI ANWAR, Department of Electrical Engineering, University of Connecticut, Storrs, CT 06269, ASHOK K. SOOD, Magnolia Optical Technolgies, Inc., 52-B Cummings Park, Woburn, MA 01801 — Zinc oxide (ZnO) provides a unique wide bandgap biocompatible material system exhibiting both semiconducting and piezoelectric properties. Bulk ZnO has a bandgap of 3.37 eV that corresponds to emissions in the solar blind ultraviolet (UV) spectral band (240-280 nm). We have grown highly ordered vertical arrays of ZnO nanowires using the metal organic chemical vapor deposition (MOCVD) technique on Si, silicon dioxide, c-plane sapphire, and GaN epitaxial substrates. UV detectors based on ZnO nanowires offer the highest UV sensitivity and lowest visible sensitivity for applications such as missile plume detection and threat warning. The development of UV detectors based on vertical nanowire arrays requires an innovative fabrication approach involving precise deposition of metal contacts, where UV sensor performance depends to a large extent on the growth conditions as well as on the substrate used. We will present experimental results on the structural, electrical, and optical properties of ZnO nanowires grown for UV sensing applications.

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