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Fabrication and Characterization of an AlGaIn-Based Four-Quadrant Solar-Blind UV Photodetector Device

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Abstract content
 (Max 300 words)

An AlGaIn-based four-quadrant solar-blind ultraviolet (UV) photodetector device was fabricated and characterized. The four-quadrant Schottky photodetector was fabricated using iridium oxide (IrO_2) as the Schottky barrier material. Fabrication of the solar-blind UV photodetector device consisted of mounting the four-quadrant photodetector onto a header, after which silver wires were epoxy bonded from the photodetector to the header. Electrical and spectral characterizations were done with an optoelectronic system before and after epoxy wire bonding for each quadrant. Electrical characterization consisted of current-voltage (I-V) and capacitance-voltage (C-V) measurements. The main parameters determined from the I-V measurements were the ideality factors, the Schottky barrier height, the reverse leakage current density at ± 1 V bias, and the series resistance. From C-V measurements the free carrier concentration profile was determined. Spectral characterization included the cut-off wavelength, responsivity and quantum efficiency at specific wavelengths of the photodetector. We also investigated the UV-to-visible rejection ratio of the photodetector device.

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