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RADIATION PERFORMANCE OF GaN AND InAs/GaAs QUANTUM DOT BASED DEVICES SUBJECTED TO NEUTRON RADIATION

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Abstract

In addition to their useful optoelectronics functions, gallium nitride (GaN) and quantum dots (QDs) based structures are also known for their radiation hardness properties. With increasing demand for such semiconductor material structures, it is important to investigate the differences in the reliability and radiation hardness properties of these two devices. For this purpose, three sets of GaN light-emitting diodes (LED) and InAs/GaAs dot-in-a well (DWELL) samples were irradiated with thermal neutron of fluence ranging from 3×10^{13} to 6×10^{14} neutron/cm² in a PUSPATI TRIGA research reactor. The radiation performances for each device were evaluated based on the current-voltage (I-V) and capacitance-voltage (C-V) electrical characterisation method. Results suggested that the GaN based sample was less susceptible to electrical changes due to the thermal neutron radiation effects compared to the QD based sample.

Keywords

Author Keywords: GaN; InAs/GaAs; quantum dots; neutron; electrical characteristics

KeyWords Plus: LIGHT-EMITTING-DIODES; OPTICAL-PROPERTIES; SCHOTTKY DIODES; GAMMA-RAY; IRRADIATION; HARDNESS; DEGRADATION; DETECTORS; VOLTAGE; SILICON

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