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## Controlled Modification of $\text{Ga}_2\text{O}_3$ Interfaces for Photovoltaic and Photoconductive UV Detectors

The Gallium Oxide ( $\text{Ga}_2\text{O}_3$ ) is an ultra-wide bandgap semiconductor with a strong potential usage on UV “solar-blind” photodetectors. This work’s objective is to create and investigate the controlled modification by ion implantation of  $\text{Ga}_2\text{O}_3$ /metal interfaces inserted in a Metal-Semiconductor-Metal (MSM) structure, to develop the previously mentioned devices to operate in different modes. These modes, photovoltaic and photoconductive, are operated based on the behavior of the two MS interfaces, which can be either Ohmic or Schottky.

These previously mentioned contacts will be made by using different metals (Ni, Ti and Pt) deposited on the semiconductor through different values of power, pressure and time deposition for the semiconductor and metal, using the magnetron sputtering deposition process. Then, post-deposition treatment processes, such as thermal annealing and specially ion implantation, are applied to modify the electrical, optical and structural properties of the MS interfaces. With the produced samples, their characterization will be through electrical, optical and morphological techniques (Profilometry, X-ray diffraction, PIXE, Rutherford backscattering spectrometry (RBS), Raman spectroscopy, Electrical characterization, Atomic force microscopy (AFM), Scanning electron microscopy (SEM)) and their evaluation through the measurement of variables associated with the photodetectors (Responsivity, Detectivity, External Quantum Efficiency, Photo-to-dark Current Ratio and the Response time).

### Field of Research/Work

Condensed Matter and Materials

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