

Abstract Submitted
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The Field Emission Properties of Gallium Nitride Nanoribbons

MORGAN LYNCH, Angelo State University, YUDONG MO, JOSE PEREZ, University of North Texas — The study of field emission (FE) properties of many nanostructures has been of importance lately in the fields of applied physics as an electron source. We focused on a sample of GaN Nanoribbons deposited on a silicon substrate. Using Ultrahigh Vacuum (UHV) techniques (on the order of a nanotorr), we study the FE properties of our GaN with a Piezotube (PZ). Fitted with a platinum tip, our PZ is moved within a distance on the order of a micron from the sample. At such a distance, we apply a voltage (typically between 60V – 600V) across the vacuum, effectively shrinking the potential barrier to a value that allows the surface electrons to “tunnel” out. These electrons are registered as a current that varies from a picoamp to a microamp exponentially. After obtaining a reasonable plot of our data, we compare it to that predicted by the Fowler-Nordheim equation. We studied the effects of Residual Gas Exposure on the FE of our sample. We used such gases as O₂, CO₂, H₂O vapor, and N₂. We also studied the effects of Cesium on our GaN sample. In addition to FE, we also studied the GaN sample using Raman Spectroscopy and Atomic Force Microscopy (AFM) techniques to better characterize our sample.

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