Abstract Submitted
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Characterization of electrospun GaN nanofibers IDALIA RAMOS, ANAMARIS MELENDEZ, KRISTLE MORALES, University of Puerto Rico at Humacao, EVA M. CAMPO, Lehigh University, JORGE J. SANTIAGO-AVILES, University of Pennsylvania, PENN-UPRH PARTNERSHIP (PREM) COLLABORATION — Gallium Nitride shows characteristics pertinent to optoelectronics and gas sensing applications. Nanofibers have been produced using electrospinning and a precursor composed of Gallium (III) Nitrate Hydrate dissolved in Dimethyl-Acetamide and Cellulose Acetate in Acetone and DMA. The resulting nanofibers were sintered at 400C in nitrogen for one hour to decompose the polymer, the furnace atmosphere switched to ammonia and the fibers sintered for periods of 3, 5 and 7 hrs at 900C. They showed morphologies with unclear dependence on processing parameters. X-ray Diffraction revealed the evolution towards wurtzite phase through annealing. From line broadening we estimate a crystalline domain size of about 12 nm. Transmission Electron Microscopy suggests nucleation and growth of X-tallites while Fourier-Transform Infrared Spectroscopy and Ultraviolet-Visible Spectroscopy confirm the material evolution towards crystallinity and the production of wurtzite GaN nanofibers. I-V characteristics of single nanofibers show linearity with increments in conductivity for those fibers ammoniated during longer periods of time. Ongoing efforts aim at improving fabrication, sensing and photoluminescence characterization.

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