

Abstract Submitted
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UV Photodetectors using Vertically-aligned GaN n-core/p-shell Arrays JONG-YOON HA¹, SERGIY KRYLYUK², DIPAK PARAMANIK, RATAN DEBNATH³, ALBERT V. DAVYDOV, Materials Science and Engineering Division, NIST, Gaithersburg, MD 20899, MATTHEW KING, Northrop Grumman ES, Linthicum, MD 21090, ABHISHEK MOTAYED⁴, Materials Science and Engineering Division, NIST, Gaithersburg, MD 20899 — The fabrication methods of GaN nanostructures, such as vertically aligned core-shell nano- and micro- pillar arrays, are critical for device applications. We have demonstrated dense arrays of vertically-oriented, individual GaN core-shell structures realized by a combination of top-down etching of the n-type pillars and subsequent p-shell epitaxial growth using selective CVD. The patterned samples were then etched in an inductively coupled plasma system to form GaN pillars. Mg-doped p-type GaN shells were then epitaxially grown over the n-GaN pillars in a custom-built horizontal hot-wall halide vapor phase epitaxy (HVPE) reactor. Room-temperature photoluminescence and Raman spectroscopy measurements indicate strain-relaxation in the etched pillars compared to the as-grown GaN film. Complete devices have been fabricated using dielectric planarization. Detailed device characterization was correlated with TEM microstructural analysis.

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