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Advanced scanning transmission electron microscopy characterization of UV LED nanowires PATRICK PHILLIPS, University of Illinois at Chicago, RAJAN KUMAR, Northwestern University, SANTINO CARNEVALE, ROBERTO MYERS, Ohio State University, ROBERT KLIE, University of Illinois at Chicago — The role of aberration-corrected scanning transmission electron microscopy (STEM) in materials characterization is examined in regards to Al(x)Ga(1-x)N nanowires. Wires were graded from x=0 to x=1 and then from x=1 to x=0 with a small active quantum disk region located between the two gradations. This configuration is the basis for previously reported UV light emitting diodes. However, to assist subsequent growth processes while striving for optimum efficiency, both structural and chemical characterization methods are necessary, which can be provided at sufficiently high resolutions by advanced STEM instruments. Specifically, structural characterization will focus on determining layer thicknesses and wire polarity, as well as visualizing any short-range ordering and/or stacking faults that may be present. STEM multislice image simulations will also be discussed. Chemically, both energy dispersive X-ray (EDX) and electron energy loss (EEL) spectroscopies will be discussed in various capacities, ranging from quantum well composition (EDX) to N K-edge fine structure of both GaN and AlN (EELS).

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