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**Optical**

**Second-Harmonic Generation from Single GaN Nanowires.**<sup>1</sup> J.P. LONG, B.S. SIMPKINS, D.J. ROWENHORST, P.E. PEHRSSON, Naval Research Laboratory, Washington DC 20375 — The nonlinear optical response of nanostructured materials is of interest because of the need for active elements in nanophotonic applications, and because the nonlinear response can provide information about the nanostructure itself. Here we report measurements of second-harmonic generation (SHG) from individual GaN nanowires (NWs) based on far-field optical microscopy. By correlating the polarization behavior of the SHG signal from each NW with its orientation as determined with electron backscattered diffraction, we show that far-field methods can provide a flexible approach for distinguishing the crystallographic orientations of wurtzite NWs lying on a substrate. Analysis is based on the quasi-static approximation, which assumes that a NW's transverse dimension (75 nm) is less than the relevant wavelengths and thus permits treating the optical electric-fields as spatially uniform. This approach proves sufficient to explain the main SHG polarization features of these NWs, once one accounts for internal depolarization effects for both the excitation and SH electric fields, and for the collection-aperture of the microscope objective.

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