

Abstract Submitted
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Imaging Minority Carrier Diffusion in Nanowires using Near Field Scanning Optical Microscopy L.G. BAIRD, R.A. COLE, N.M. HAEGEL, Naval Postgraduate School — A novel system integrating a near-field scanning optical microscope with a scanning electron microscope is used to image minority carrier diffusion in GaN nanowires. Luminescence associated with carrier recombination is collected with high spatial resolution to image the recombination of carriers generated by use of an electron beam as an independent point source. Light is collected in the near field from a scanning fiber using tuning fork feedback in an open architecture combined AFM/NSOM. The instrument allows for independent scanning of the NSOM probe. With a single image, it is possible to obtain a direct measure of minority carrier diffusion length from the recombination profile. Measurements are presented for n-type GaN-AlGa_N core-shell nanowires, grown via Ni-catalyzed MOCVD, as well as unintentionally doped and Mg-doped GaN nanowires. For the core/shell wires, we measure a hole diffusion length of $\sim 1.2 \mu\text{m}$. This work is supported by NSF Grant DMR 0804527.

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