

# Single-nanowire GaN LEDs grown by molecular beam epitaxy

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We have shown that single GaN nanowires can be fabricated into LEDs,[1] which opens up a number of interesting application areas such as on-chip communications and scanning probe characterization. The GaN nanowires are grown with catalyst-free molecular beam epitaxy, resulting in material of high purity and low defect density. The GaN LEDs are limited in performance primarily by p-type contacts and doping. Morphology control remains a significant issue as well. This talk will describe efforts to improve luminescence efficiency and demonstration of simple devices.

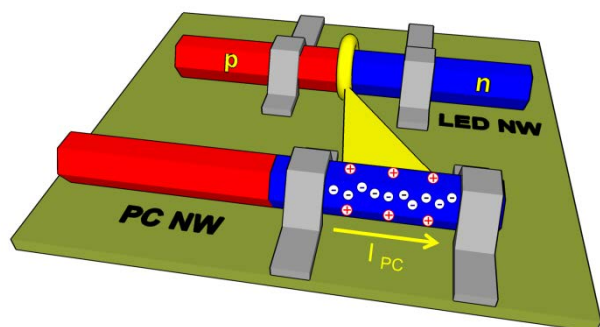


Fig. 1 Schematic diagram of GaN nanowire LED-photoconductive detector arranged as a simple optical coupler (from Ref. 1).

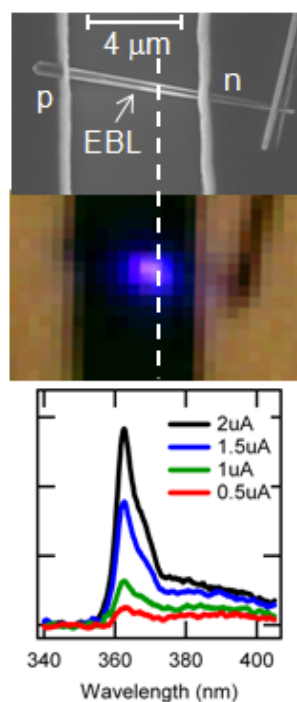


Fig. 2 SEM photo, light emission photo, and spectr from a single GaN nanowire LED (from Ref. 2).

- [1] M. D. Brubaker, P. T. Blanchard, J. B. Schlager, A. W. Sanders, A. Roshko, S. M. Duff, J. M. Gray, V. M. Bright, N. A. Sanford, K. A. Bertness, *Nano Lett.* **13**, 374-377 (2013).
- [2] M. D. Brubaker, P. T. Blanchard, J. B. Schlager, A. W. Sanders, A. M. Herrero, A. Roshko, S. M. Duff, T. E. Harvey, V. M. Bright, N. A. Sanford, K. A. Bertness, *J. Electron. Mat.* **42**, 868-874 (2013).