

Research Highlights

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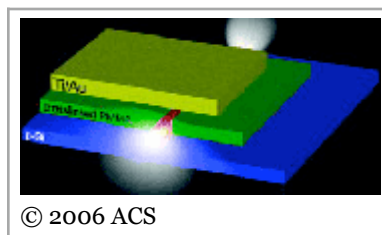
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Photonics: Better contacts for single nanowires

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The ability to make electrical contacts with single nanowires will lead to improved semiconductor light sources

Researchers in the US have made the first zinc-oxide single-nanowire light-emitting diode (LED). The device relies on a new approach for achieving reliable electrical injection into single semiconductor nanowires that has been developed by Federico Capasso and colleagues¹ at Harvard University and Boston College.



The fabrication method uses poly(methylmethacrylate) (PMMA) as a negative resist, and direct electron-beam patterning to create a metallic top contact along the length of the nanowire, which allows uniform electrical injection. A planar substrate is used for the bottom contact. The success of the technique relies on the precise alignment of the electron beam. Other important factors include the thickness of the PMMA film, the electron-beam dose and the time taken to develop the PMMA film.

The devices made by the Harvard-Boston group show reasonable PN junction characteristics and light emission over a range of wavelengths between 350 nm and 850 nm. Capasso and colleagues say that the approach can be applied to any nanowire structure with an arbitrary cross-section.

REFERENCES

1. Bao, J. *et al. Nano Lett.* (2006). | [Article](#)
(<http://dx.doi.org.ezp1.harvard.edu/10.1021/nl061080t>) |