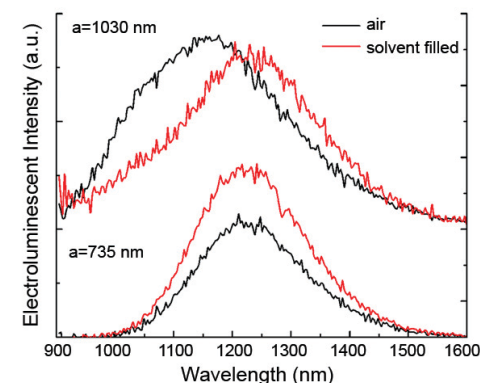


Achievement:

We have developed an approach for **three-dimensional template-directed epitaxy** of high-performance III-V semiconductor materials. We have demonstrated optoelectronic functionality by fabricating a **3D photonic crystal LED**, the first-ever electrically driven emission from a 3D photonic crystal device. We also demonstrate that the LED has an emission spectrum that is modified by the photonic crystal architecture.

Significance:

Integration of 3D photonic crystals with high-performance materials for **photovoltaics** and **solid-state lighting** makes possible **omni-directional control over light** with potential for unique designs which enhance light-matter interaction in unexpected ways.



E. Nelson, et al., *Nature Materials* **10**, 676-681 (2011)



September 2011 Research Highlight

LIGHT-MATERIAL INTERACTIONS IN ENERGY CONVERSION

