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Energy Conversion Efficiency in Nanotube Optoelectronics FRANÇOIS LÉONARD, Sandia National Laboratories, DEREK STEWART, Cornell Nanoscale Facility — We present theoretical performance estimates of nanotube optoelectronic devices under bias. Current-voltage characteristics of illuminated nanotube p-n junctions are calculated using a self-consistent non-equilibrium Green's function approach. Energy conversion rates in the tens of percent range are predicted for incident photon energies near the band gap energy. In addition, the energy conversion rate increases as the diameter of the nanotube is reduced, even though the quantum efficiency shows little dependence on nanotube radius. These results indicate that the quantum efficiency is not a limiting factor for use of nanotubes in optoelectronics.

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