Light emission from zinc oxide nano-forest

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University of Connecticut — Zinc oxide nanorods were grown on patterned highly
doped silicon microstructures (~2-10 μm long) through a chemical bath deposition
technique. Homogeneous and uniform coverage was obtained, with the length of
the nanorods of ~2 μm and diameter of ~150 nm. When microsecond pulses (up
to 50V) were applied across the microstructures, very bright and intense flashes of
blue-white light were obtained. The output spectra, acquired with a high sensitivity
spectrometer (≈1 nm FWHM), showed sharp peaks in the UV range (330-334
nm) and high-intensity peaks in the blue range (467-480 nm), matching Zn atomic
transitions, and broad emission from 450 nm to 800 nm, suggesting formation of
a plasma. The voltage generated by the emitted light on a photosensitive PIN
diode placed close to the sample and the electrical current through the sample were
captured simultaneously using an oscilloscope to correlate the electrical and optical
responses and determine the times of the plasma’s generation and power dissipation.

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