Abstract Submitted
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Remote Plasma Driven Modifications in Luminescent Properties of ZnO Nanopowders HENRY VALLEJO[1], North Side High School, Fort Worth, TX, ANTONIO PARAMO, RAUL PETERS, PANKAJ KUMAR, YURI STRZHEMECHNY, Texas Christian University, Fort Worth, TX — Photoluminescence (PL) spectra of several commercially available ZnO nanopowders were investigated for as-received and remote-plasma treated samples. Sample-to-sample spectral discrepancies, even for materials from the same vendor, were observed at room temperatures as well as at 8 K. These differences, in both the near-band transitions and defect luminescence, are significant enough to obscure possible spectral dependence on the average nanocrystalline grain size and the grain size distribution (as measured by electron microscopy). Temperature-dependent PL spectra were analyzed in detail for the bound exciton range. Numerical fits of peak intensities and peak positions vs. temperature for a number of excitonic emissions using Arrhenius and Varshni approximations yielded activation energies and Debye temperatures. Significant spectral modifications were observed, at room and low temperatures, after the nanopowders were treated with remote O, N, and H plasmas. Different plasma species produced distinct signatures in the spectra.

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