Abstract Submitted
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Enhanced optical luminescence in ZnO nanostructures following O 1s to p_z excitation[1] R.A. ROSENBERG, G.K. SHENOY, Argonne National Laboratory, X.-T. ZHOU, T.K. SHAM, University of Western Ontario — Room temperature ultraviolet (∼385 nm) lasing in ZnO nanostructures has recently been demonstrated.[1] This phenomenon is thought to arise from the natural cavity formed by the wurtzite nanostructure and its faceted ends. X-ray excited optical luminescence (XEOL) provides the capability to determine the nature of the sites responsible for producing low energy (1-6 eV) fluorescence. We will present XEOL excitation curves taken at the Zn L and O K edge obtained using both the defect (∼510 nm) and bandgap (∼370 nm) transitions as signals. Results obtained at the Zn L edge resemble the x-ray absorption curve of the nanostructure. However, striking differences are observed at the O K edge. Excitation to states of p_z symmetry (along the c axis) leads to enhanced luminescence while excitation to $p_{x,y}$ states (lying in the basal plane) decreases the yield. We interpret this phenomenon as resulting from the lower probability of quenching by near surface defects for states excited along the c-axis as opposed to those excited perpendicular to it. 1. M.H. Huang, *et al.*, Science **292**, 1897 (2001).

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