Abstract Submitted
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Optical Properties of the Defect State Luminescence of Zn2SnO4 Nanowires[1] BAICHHABI YAKAMI, UMA PAUDYAL, SHASHANK NANDYALA, GAURAB RIMAL, University of wyoming, JASON K. COOPER, Lawrence Berkeley National Laboratory, JIAJUN CHEN, University of New Orleans, TEYU CHIEN, WENYONG WANG, JON M PIKAL, University of wyoming, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING TEAM, DEPARTMENT OF PHYSICS AND ASTRONOMY TEAM — Nanowires (NWs) are a promising option for sensitized solar cells, sensors & display technology. Most of the work thus far has focused on binary oxides for these NWs, but ternary oxides have advantages in additional control of optical and electronic properties. Here we report on the diffuse reflectance, Low Temperature (LT) and Room Temperature (RT) photoluminescence (PL), PL excitation and Time Resolved PL (TRPL) of Zinc Tin Oxide (ZTO) NWs grown by Chemical Vapor Deposition. Our results show two broad peaks centered at 640 nm & 450 nm. The complex emission spectra was studied by Time Resolved Emission Spectroscopy (TRES) and Intensity dependent PL. The intensity dependent TRPL shows that 640 nm states decay much slower than the 450 nm states. We propose an energy band model for the NWs containing donor and acceptor states in the band gap with the associated transitions between these states that are consistent with our results. The effect of annealing in air and vacuum is carried out to study the origin of defect states in these NWs. .

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