

Abstract Submitted
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Optoelectronic Characterization and Luminescence Studies of Sn doped ZnO Single Crystals MICAH HASEMAN, Bowling Green State University — High quality undoped and Sn doped zinc oxide (Sn:ZnO) single crystals were grown by the chemical vapor transport method (CVT) and the effects of Sn doping on the electrical and optical properties of ZnO were investigated. Sn doping led to a marked increase in the electrical conductivity, carrier concentration and Hall mobility. The increase in carrier concentration was associated with a change in color from colorless to dark blue. Optical absorption measurements revealed that the dark blue color is due to a broad peak in the red region and is unrelated to the optical band gaps of the crystals. We anticipate that the formation of defect complexes that quench the luminescence are induced by Sn doping while Sn donors are behind the increase in electrical conductivity and the deep coloration. Using low-temperature thermal stimulated luminescence spectroscopy, a number of donor species have been identified with donor ionization energies ranging from 35 to 118 meV.

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