

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Structural, optical, and thermal stability properties of CdZnO thin films grown by molecular-beam epitaxy (MBE)¹ ZHENG YANG, LIN LI, SHENG CHU, JIEYING KONG, JIANLIN LIU, Quantum Structures of Laboratory, Department of Electrical Engineering, University of California, Riverside, California 92521 — CdZnO thin films with near-band-edge emission from violet (3.07 eV) to orange (2.04 eV) were grown using MBE. The CdZnO thin films evolve from pure wurtzite (wz) structure to mixture of wz and rocksalt (rs) structures, and finally to pure rs structure, with increasing Cd concentration. Wz CdZnO shows a robust thermal stability than the rs CdZnO. The temperature dependence of the CdZnO bandgap shrinkage was investigated and analyzed based on the empirical Varshni and Bose-Einstein fitting of the variable-temperature photoluminescence (PL) peak positions. The fitting parameters are not only useful for materials study, but also important for future device applications. The temperature-dependence of the integral PL intensity was fitted with and without considering the hopping term. Fitting with hopping term shows significant improvements to the data in the CdZnO thin films, but no evident change in a ZnO reference thin film, indicating the hopping process in the CdZnO thin films.

¹Supported by ONR/DMEA CNN No. H94003-08-2-0803.

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Date submitted: 11 Dec 2008

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