

Abstract Submitted
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Pressure Response of the UV-Photoluminescence of ZnO and MgZnO Nanocrystallites JESSE HUSO, JOHN L. MORRISON, HEATHER HOECK, LEAH BERGMAN, Physics Dept., University of Idaho, SLADE JOKELA, MATTHEW MCCLUSKEY, Physics Dept., Washington State University, TSVE-TANKA ZHELEVA, Army Research Lab, DEPT. OF PHYSICS, WASHINGTON STATE UNIVERSITY COLLABORATION, ARMY RESEARCH LAB COLLABORATION — ZnO and $\text{Mg}_x\text{Zn}_{1-x}\text{O}$ are promising next-generation wide-bandgap semiconductors for high efficiency optical applications. $\text{Mg}_x\text{Zn}_{1-x}\text{O}$ alloys enable the tuning of the photoluminescence¹ [PL] at the range of $\sim 3.0 - 7.0$ eV. Additionally, nanomaterial properties under high pressure are of significant importance to the field of devices operating under extreme conditions. Here, we present studies of the pressure response of the UV-PL of ZnO and $\text{Mg}_{0.1}\text{Zn}_{0.9}\text{O}$ nanocrystallites of size ~ 30 nm. We found that up to 6 GPa the pressure coefficients of ZnO and MgZnO are 23 and 27 meV/GPa, respectively. The pressure coefficient of the ZnO nanocrystallites is similar to that of the bulk ZnO. The higher value found for $\text{Mg}_{0.1}\text{Zn}_{0.9}\text{O}$ is discussed in terms of the atomic numbers of the cation constituents. L. B. acknowledges NSF-CAREER-DMR-0238845, and DOE-DEFG02-04ER46142. M. M. and L. B. acknowledge the ACS PRF-40749AC10.

¹L. Bergman, et. al, Appl. Phys. Lett. **88**, 023103 (2006)

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