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Optical and Structural Properties of Luminescent MgZnO Nanoalloys LEAH BERGMAN, Department of Physics University of Idaho — Mg(x)Zn(1-x)O alloys are promising wide-bandgap semiconductors for UV applications, and also of considerable interest from a fundamental viewpoint. These optical alloys may enable the tuning of the bandgap and the luminescence at the range of $\sim$ 3.0 for ZnO of the wurtzite structure up to $\sim$ 7 eV for the MgO of the rocksalt structure. We will present studies on the photoluminescence and Raman properties of Mg(x)Zn(1-x)O nanocrystallites. For the studied composition range of 0-26% Mg, the room temperature UV-PL was found to be tuned by $\sim$ 0.3 eV towards the UV-spectral range. For that composition range the first-order LO Raman mode was found to exhibit a significant blueshift of $\sim$ 33 cm^{-1} indicating that a good solid solution was achieved at the nanoscale. At higher composition ranges a PL blue shift of at least 1.3 eV was achieved. Issues such as excitonic emissions, alloy spectral broadening, phonon symmetry, as well as temperature and pressure response of the nanoalloys will be presented.

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