

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

CuPt atomic ordering and band gap reduction in AlInP for green LED applications DANIEL BEATON, NREL, KUNAL MUKHERJEE, MIT, KIRSTIN ALBERI, THERESA CHRISTIAN, ANGELO MASCARENHAS, NREL, EUGENE FITZGERALD, MIT — Efficient light emission in the wavelength range of 575-595nm (green/amber) is necessary for high colour rendering index (CRI) colour-mixed white LED light sources. The present lack of efficient light emitters in this range is known as the 'green gap'. However, it is possible to achieve efficient green/amber light emission with III-V semiconductor alloys, specifically by using direct band gap AlInP alloys, where carrier confinement for device application can result from the band off-set between ordered and disordered material of the same composition. The greater size discrepancy between Al and In results in higher degrees of CuPt atomic ordering and larger band gap reductions than typically reported for other order materials, such as GaInP. Samples are grown lattice matched to InGaAs graded buffer layers grown on GaAs substrates and atomic ordering is observed by TEM. Photoluminescence and modulated reflectance characterization are used to quantify the band gap shift as a function of order parameter.

Daniel Beaton
NREL

Date submitted: 08 Nov 2012

Electronic form version 1.4