Abstract Submitted
for the NWS17 Meeting of
The American Physical Society

Single Phase Metastable Alloys by PLD-Layering[1] BETHANY MATTHEWS, Oregon State University, A. HOLDER, National Renewable Energy Lab, L. SCHELHAS, SLAC National Accelerator Laboratory, M. FORKNER, J. MAY, Oregon State University, B. GORMAN, Colorado School of Mines, S. LANY, National Renewable Energy Lab, P. ESCHBACH, J. TATE, Oregon State University
— Pulsed laser deposition (PLD) is a high-energy synthesis technique that enables novel thin film systems with versatile and interesting chemistry. An example is the metastable heterostructural alloy Sn1-xCaxSe, an alloy of cubic rocksalt CaSe and orthorhombic SnSe, which is predicted to transition from RS to OR at x = 0.13. In PLD, high energy species overcome high mixing enthalpies to form metastable structures. If decomposition pathways are kinetically hindered, an alloy is stabilized. Here we explore how PLD can form stable, single-phase alloys with different microstructures and properties. Structural properties of all compositions were examined by TEM, STEM, and electron and x-ray diffraction; composition by electron probe microanalysis and energy dispersive x-ray spectroscopy. Seebeck and Hall coefficients were measured to quantify the thermal and electrical properties and optical transmission and reflection determined the band gap and absorption.

[1]The work was supported as part of the CNGMD, an EFRC funded by the U.S. DOE, Office of Science.

Bethany Matthews
Oregon State University

Date submitted: 16 May 2017 Electronic form version 1.4