Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Optical properties of AlGaAsSb thin films lattice-matched to InP(100) SUKGEUN CHOI, NREL, GLEN HILLIER, JESSICA ADAMS, MicroLink Devices — AlGaAsSb quaternary compounds lattice-matched to InP are of interest for applications in InP-based high-efficiency multi-junction solar cells and surface normal opto-electronic devices operating in the wavelength range from 1.3 to 1.55 μm. Knowledge of optical properties of constituent layers in photonic and photovoltaic devices plays an important role in designing the device structure and modeling the device performance. However, only a limited number of theoretical and experimental studies have been done on AlGaAsSb lattice-matched to either GaSb or InAs, and no systematic optical study is available for AlGaAsSb lattice-matched to InP. Here we apply spectroscopic ellipsometry to study the optical properties of AlGaAsSb thin films grown by MOVPE on InP substrates. The fundamental optical functions such as dielectric function, refractive index, reflectivity, and absorption coefficient are determined by modeling the data. Energies for several critical points and their compositional dependence are obtained from standard lineshape analysis. The results from our study can be used (1) to improve our understanding of the electronic structure of AlGaAsSb and related compounds and (2) to provide optical information for the design of InP-based multi-junction solar cell structures.

Sukgeun Choi
NREL

Date submitted: 08 Nov 2013 Electronic form version 1.4