

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Raman Investigation of p-type Amorphous Silicon Thin Films<sup>1</sup>**

KIRAN SHRESTHA, CHRISTOPHER LITTLER, VINCE LOPES, ATHANASIOS SYLLAIOS, University of North Texas Department of Physics — Thin film layers of p-type a-Si:H of differing doping concentration and hydrogen dilution were investigated by Raman spectroscopy to determine their effect on short- and mid-range order. In this study, the TA and TO peaks were used to study the microstructure of the thin films. Our analyses reveal an interesting counter-balance relationship between the boron-doping and hydrogen-dilution growth parameters. Specifically, an increase in the hydrogen dilution ratio ( $H_2/SiH_4$ ) was found to cause the increase in the short-range order, as evidenced by an increase in the TO frequency and a decrease in the FWHM of the spectral peak. However, an increase in the doping concentration resulted in a decrease in the short-range order, as evidenced by a decrease in the TO frequency and an increase in the FWHM of the spectral peak. These results will be correlated with Multiple Internal Reflection Infrared Spectroscopy, electrical transport and noise in a-Si:H thin films to determine the effects of doping and hydrogen on the transport mechanisms in a-Si:H.

<sup>1</sup>Supported by ARO grant W911NF-10-1-0410, William W. Clark, Program Manager

Christopher Littler  
University of North Texas Department of Physics

Date submitted: 07 Nov 2012

Electronic form version 1.4