

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Ultrafast optical measurements of ultrasound attenuation in amorphous silicon at 50 and 100 GHz¹ BRIAN DALY, DONALD HONDONGWA, Vassar College, THEODORE NORRIS, University of Michigan, BAOJIE YAN, JEFF YANG, SUBHENDU GUHA, Uni-Solar Ovonic LLC — We present ultrafast optical measurements of the attenuation of 50 – 100 GHz ultrasound in hydrogenated amorphous silicon (a-Si:H) thin films. The films were grown using a modified very high frequency glow discharge method on steel substrates. The deposition conditions were similar to those used for high efficiency solar cells. The measurements were performed at 300 K using the picosecond ultrasonics technique. Films of varying thickness were measured so that the effect of intrinsic acoustic loss within the a-Si:H could be determined. We find that the ultrasonic attenuation in a-Si:H at 100 GHz is more than an order of magnitude lower than is found in other amorphous materials. Our results may impact theoretical models of thermal transport in amorphous materials, and could provide a new avenue for studying voids in a-Si:H and nanocrystalline Si films.

¹This work was supported by NSF award DMR-0906753.

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Date submitted: 16 Nov 2010

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