Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Impact of a high resistivity transparent (HRT) layer on ultra-thin CdTe devices[1] HASITHA MAHABADUGE, KRISTOPHER WIELAND, The University of Toledo, ALVIN COMPAAN, The University of Toledo;Xunlight 26 Solar, LLC — Pushing the limits of the absorber layer thickness to submicron levels without compromising the efficiency in CdTe devices is important for several reasons. Reducing the thickness of the CdTe layer can increase the manufacturing speed and lower the material usage, production time, cost and energy needed for production. Thickness fluctuations in these submicron devices can lead to shunting when these fluctuations are comparable to the absorber layer thickness. Introducing a high resistivity transparent (HRT) layer in the device structure can reduce such shunting. We find that the impact of the HRT layer is higher for ultra-thin absorber layers. In this study, the effect of using sputtered ZnO as the HRT layer was investigated for devices with a 0.2 μm CdTe layer. Our results show a 40% increase in efficiency in the CdTe devices with the HRT layer compared to the devices without the HRT layer. The increase in efficiency is primarily from improved fill factor due to an increase in shunt resistance from 0.15 kohm-cm^2 to 0.32 kohm-cm^2. As a result of increased shunt resistance there is an increase in the efficiency as well as a substantial increase in the yield for small dot cells.

[1]Work supported by Xunlight 26 Solar and the Ohio Third Frontier Advanced Energy Program.

Hasitha Mahabaduge
The University of Toledo

Date submitted: 22 Nov 2011 Electronic form version 1.4