Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

A plasma-enhanced close-spacing sublimation (PECSS) device for photovoltaic thin-film modification GARRETT METZ, Colorado State University - Department of Mechanical Engineering, LEN MAHONEY, Colorado State University Faculty Affiliate, JOHN WILLIAMS, DREW SWANSON, WALAJABAD SAMPATH, Colorado State University - Department of Mechanical Engineering — A plasma-enhanced, close-spacing sublimation (PECSS) device has been developed for improving CdS deposition on a transparent conductive oxide (TCO)-coated substrate that is part of the plasma production circuit. This unique device and process method makes possible the elimination of pin holes in the CdS transmission layer. In addition the process has been used to incorporate oxygen-dopants within the CdS layer, reducing absorption, and thereby increasing cell efficiency. We review the spatial uniformity of the ion current flux on the TCO-coated substrate when operating with Ar/O_2 and N_2/O_2 by means of in situ surface probes fashioned by laser-scribing strips in the TCO coating. Bulk plasma features of the PECSS device are also reviewed including electron energy and plasma potential. Process utility, modeling, and scaling of the PECSS device are reviewed for pressures of 40-200 mTorr and surface areas of 60 – 1700 cm^2.

Garrett Metz
Colorado State University - Department of Mechanical Engineering

Date submitted: 07 Jun 2012 Electronic form version 1.4