Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Imaging the solar cell p-n junction and depletion region using secondary electron contrast[1] JENNIFER HEATH, Linfield College, CHUN-SHENG JIANG, MOWAFAK AL-JASSIM, National Renewable Energy Laboratory — We report on secondary electron (SE) images of cross-sectioned multicrystalline Si and GaAs/GaInP solar cell devices, focusing on quantifying the relationship between the apparent n^+-p contrast and characteristic electronic features of the device. These samples allow us to compare the SE signal from devices which have very different physical characteristics: differing materials, diffused junction versus abrupt junction, heterojunction versus homojunction. Despite these differences, we find that the SE image contrast for both types of sample, and as a function of reverse bias across the diode, closely agrees with PC1D simulations of the bulk electrostatic potential in the device, accurately yielding the depletion edge and width. A spatial derivative of the SE data shows a local maximum at the metallurgical junction. Such data are valuable, for example, in studying the conformity of a diffused junction to the textured surface topography. These data also extend our understanding of the origin of the SE contrast.

[1]This work was partially supported by the Petroleum Research Fund of the American Chemical Society

Jennifer Heath
Linfield College

Date submitted: 10 Nov 2011 Electronic form version 1.4