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Characterization of Grain Boundaries in Polycrystalline Photovoltaic Devices using Near-Field Scanning Optical Microscopy. J.M. YARBROUGH, I.C. SCHICK, V. KAYDANOV, T.R. OHNO, R.T. COLLINS, Colorado School of Mines — Polycrystalline thin film PV devices have the potential to reduce the cost per watt for commercial photovoltaic, but, their lower efficiency compared to their counter parts and lack of stability have prevented their widespread adoption. There is a need for a more fundamental understanding of these PV devices. A near-field scanning optical microscope (NSOM) has been built to optically and electrically characterize polycrystalline thin film PV devices. The NSOM is presently being used in air and at room temperature to perform spatially resolved photocurrent measurements using a broad range of visible excitation wavelengths on planar PV devices. Results from the front side illuminated planar CdTe devices show between a 5 and 10% increase in the generated photocurrent between the grains supporting the idea of charge separation at the grain boundary. Unlike previous studies, these photocurrent measurements have been decoupled from the topographical cross talk typically common to NSOM measurements. The authors gratefully acknowledge support from the National Science Foundation under Grant No. DMR-0103945 and samples provided by the University of Toledo.

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