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Modulated photocurrent spectroscopy of thin film solar cells BEHRANG HAMADANI, JOHN ROLLER, EL, NIST, PANAGIOTIS KOUNAVIS, University of Patras, NIKOLAI ZHITENEV, CNST, NIST, DAVID GUNDLACH, PML, NIST — We used the modulated photocurrent spectroscopy technique based on sinusoidal excitation of high-powered LEDs to investigate the dynamic response of charge carrier transport in thin film solar cells based on CdTe. The impact of light bias, voltage bias and the temperature over a broad excitation frequency bandwidth were studied. The observed features of the data, including a photocurrent phase-lead and a phase-lag over different regions of the frequency spectrum, were explored in the context of an equivalent circuit model. Comparisons between the model's predicted performance and the measured data suggest that charge carrier recombination at the cell's back metal/semiconductor contact is the main source of photocurrent loss in the cells that were investigated by our group.

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