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PLD Fabrication of CdTe-based Thin Film Solar Cells D. JAKE MEETH, JIANWEI LIU, RONGTAO LU, PAUL HARRISON, University of Kansas Dept. of Physics & Astronomy, BING LI, College of Materials Science & Engineering, Sichuan University, China, JUDY WU, University of Kansas Dept. of Physics & Astronomy — This work explores *in situ* fabrication of thin film solar cells using pulsed laser deposition (PLD). Optimization of the PLD processing conditions, including laser energy density, substrate temperature, and the PLD chamber pressure, was achieved with respect to pinhole-free CdS and CdTe layers and solar power conversion efficiency. By introducing a novel quantum based structure called Single Offset Superlattice (SOS) to the thin film cell, further increases to the efficiency have been made. SOS allows for tuning of the charge carrier density of the semiconductor. The efficiency of a thin film solar cell can be improved, relatively easily, by pairing the *in situ* capability of PLD with the complicated structure of SOS. High efficiency up to 6.68% has been demonstrated with a CdS (100nm)/CdTe (1500nm) cell and 8.88% efficiency has been achieved with the introduction of SOS structure. Improved performance is expected with optimized PLD conditions and SOS dimensions.

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