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Device Architecture for Next Generation CdTe PV¹ ALEXANDRA HUSS, ANNA WOJTOWICZ, JENNIFER DRAYTON, JAMES SITES, Colorado State University, DARIUS KUCIAUSKAS, National Renewable Energy Laboratory — Thin CdTe solar cells with absorber thickness of approximately $1.0\ \mu\text{m}$ were fabricated with varied close-space sublimation (CSS) conditions to optimize the performance of the cells. A CdCl₂ dose time of approximately 125 seconds is the optimal treatment for passivation of these devices, and the addition of an optimal CuCl treatment of 2 second dose time with a 50 second anneal produces a $1.0\ \mu\text{m}$ cell that is approximately 14% efficient. Single and two-photon TRPL measurements from both sides of the solar cell indicate that back interface recombination dominates recombination losses and a high diode quality factor is the main limitation on fill factor for thin CdTe cells. The optimized device structure produces devices that have repeatable $\sim 14\%$ efficiency and cells show excellent crystal structure and continuous MgZnO and Te layers.

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