

Abstract Submitted
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Optimization of Layer Properties for High Efficiency CdTe solar cell with Higher Band Gap CdMgTe Layer as Back Electron Reflector
JINMING ZHANG, JAMES SITES, Colorado State University — Thin film CdTe solar cell has been an option for PV energy solution with a potential of massive terrestrial installation. The open circuit voltage of traditional CdTe cell (up to 0.85V) has been the biggest limit to higher cell efficiency. Adding an additional layer of CdMgTe as back electron reflector with fitted band alignment to CdTe has been proposed to increase Voc by as high as the conduction band energy offset (CBO). Further increase from the same approach may cause tradeoff of fill factor and Jsc. Study of band structure, dark and light J-V curves, quantum efficiency spectrum has been carried out by applying a1-D numerical simulation program. Layer properties are optimized considering experimental facts for charge generation, separation and collection. Primary experimental results have demonstrated the prediction on cell degradation caused by valence band barrier between CdTe and CdMgTe. Solutions have been proposed for further improvements.

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