

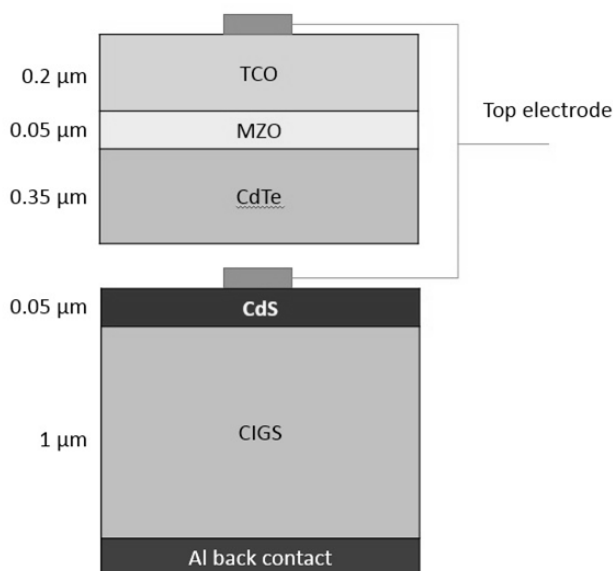
## Parameter optimization of the II-VI thin-film photovoltaic tandem solar cell model of MZO/CdTe and CdS/CIGS

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In this simulation model we have constructed a photovoltaics tandem device with a top cell of window layer n-MZO (Mg doped ZnO), with an absorber layer of (II-VI) thin-film of p-CdTe and the bottom cell with window layer n-CdS and thin absorber layer of (II-VI) p-CIGS. Photovoltaic properties of CdTe/CIGS tandem solar cell have been studied by the Solar Cell Capacitance Simulator (SCAPS-1D) software. The thicknesses of n-CdS, p-CIGS, and the p-CdTe layers have been varied to improve the tandem solar cell device parameters such as open circuit voltage, short circuit current, fill-factor and the device efficiency. All the numerical simulations were conducted with one sun illumination condition with AM1.5G solar spectrum without any light trapping methods. In this simulation, we have observed 1.37 V open circuit voltage, 24.5 mA/cm<sup>2</sup> short circuit current, 85.9 fill factor and the highest efficiency value of 28.8493%. In this study we have presented a model of a tandem solar cell structure which can be used to enhance the performance of existing solar cells with the least material usage.

*Keywords: SCAPS-1D, Tandem solar cell, Photovoltaics, AM1.5g*



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