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Work function dependence of efficiency for Cadmium Telluride (CdTe) solar cells[1] BROOKE MYERS, FERNANDA DUARTE, TYLER LUCAS, BRANDON BARNES, WEINING WANG, Seton Hall Univ — Recently First Solar has announced that the highest efficiency of CdTe/CdS solar cells has reached 21.0%, which is still lower than the theoretical limit. One of the reasons is that it is hard to form a good ohmic back contact on p-type CdTe. CdTe has a high electron affinity (about 4.5 eV), so a metal with high work function is needed to form a good ohmic contact with CdTe. Conducting polymers are good candidates for the back contact because they have high work functions and high conductivities, are easy to process, and cost less, meeting all the requirements of a good ohmic back contact for CdTe. In our previous studies, we have showed that poly(3,4-ethylenedioxythiophene) polystyrene sulfonate can be used as the back contact of CdTe solar cells and the results are very promising. In this work, we show our studies on the work function dependence of CdTe/PEDOT:PSS solar cells. CdTe solar cells were fabricated with PEDOT:PSS solutions with different work functions, and were characterized using a Keithley 2400 sourcemeter. We found that the open-circuit voltage of the CdTe solar cells is higher for solar cells with higher polymer work functions. The results provide us criteria in choosing suitable polymer back contact for efficient CdTe solar cells.

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