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Numerical Simulation of the Influence of an Sb layer on a Cu (In,Ga)Se₂ Solar Cells Performance

Abdelghani Bouabdallah

LMSM, Univerité de Biskra, Biskra, Algeria

ABSTRACT

A comprehensive study of adding an antimony (Sb) layer on top of the Mo layer in a low cost CIGS solar cell is presented. It was found that adding Sb layer improves the solar cell efficiency which was attributed to the reduction of defects at the CdS/CIGS interface. To elucidate this phenomenon, numerical simulation is used to evaluate a CIGS thin film solar cell figures of merits with and without an Sb layer. The cell performance is evaluated by introducing defects at the interface CdS/CIGS. An improvement of the conversion efficiency from 12,08 to 13,6% is reached. The short circuit current density J_{sc} improved from 25,74 to 26,46 mAcm^{-2} , the open circuit voltage V_{OC} is reduced from 0.674 to 0.670 V and the fill factor FF increases from 69.57 to 77.13%. The calculated figures of merit are in good agreement with the measurement.

