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Performance analysis of MASnI3 based solar cell with Gold (Au) as back metal contact using 1D-SCAPS simulation program.
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Abstract
In this present work we report a numerical modeling for performance analysis of Methyl ammonium tin iodide (MASnI3) based perovskite solar cells using 1D-SCAPS simulation program. An inorganic compound-Phenyl-C61-butyric acid methyl ester (PCBM) as electron transport material (ETM) and Copper iodide (CuI) as hole transporting material (HTM) are used for simulation study in a p-i-n configuration. The characteristic parameters: short circuit current density, open circuit voltage and the conversion efficiency of the solar cell are determined by varying different input parameters as thickness of absorption layer, working point etc. From the stimulation study, it is seen that Glass / PCBM / MASnI3 / CuI / Au exhibits optimum performance with a Power Conversion Efficiency (PCE) of 25.76 %, Fill Factor (FF) of 77.25 %, a short circuit current density (Jsc) of 34.076796 mA/cm2 and an open circuit voltage (Voc) of 0.9780 V under 300 K temperature.

Keywords: Methyl ammonium tin iodide (MASnI3), Phenyl-C61-butyric acid methyl ester (PCBM), Copper iodide (CuI), Back metal contact (Au), Perovskite solar cells, SCAPS 1D.

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