

Potentials of $\text{In}_x\text{Ga}_{1-x}\text{N}$ photovoltaic tandems

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Abstract: During the past few years a great variety of multi-junction solar cells has been developed with the aim of a further increase in efficiency beyond the limits of single junction devices. In this work, the solar power conversion efficiency of $\text{In}_x\text{Ga}_{1-x}\text{N}$ based tandem solar cells was investigated. With this intention, one simulation of the spectral response and the current-voltage characteristic was carried out using a simulation program designed under 'Visual Basic 5' language for this reason. Our calculation indicates that the attainable efficiency can be enhanced up to 34 % and 37% for tandems with double and triple junctions respectively, obtained under 1-sun AM1.5 illumination and at ambient temperature, using realistic material parameters. A comparison has been made of our results with those of other models.

Keywords : Tandem, InGaN, Spectral response, I-V characteristics