High Efficiency Tandem Perovskite/CIGS Solar Cell

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Abstract

This paper presents a study of a tandem Perovskite/CIGS cell, its performance parameters, and the effect of temperature variations on these parameters. The variation of each sub-cell short-circuit current density value with absorption thickness of perovskite (top) sub-cell has been done to find the matching point, as the two sub-cells equivalent to two series cells. The combining of two sub-cells shows the ability to absorb photons spectrum up to 1120 nm and perform a conversion efficiency about 30.5% (at room temperature) higher than each sub-cell. The variation of temperature from 260 K up to 360 K shows that the power conversion efficiency decreases almost linearly from 33.5% to 26.6%. The validity of the proposed tandem cell is proved by comparing its results with the recent published results. The proposed tandem cell shows one of the highest power conversion efficiency relative to the recent published results.

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