Abstract

This work presents a 1D simulation of light J-V characteristics of a GaP/ Si heterojunction thin film solar cell on glass substrate. The device is composed of a GaP/ Si n-p heterojunction, where the p-type Si layer serves as the absorber. A heavily doped p-type Si layer is used between the absorber and the substrate as a Back Surface Field (BSF) layer. The obtained results show slight improvement in short-circuit current density (Jsc) and efficiency, compared to the present thin film poly-Si solar cells fabricated on glass substrate. At 1 sun, under AM1.5G, the open-circuit voltage (Voc) and the short-circuit current density (Jsc) were obtained as 0.5582 V and 28.42 mA/cm2, respectively. With a fill factor of 0.8274, the efficiency was calculated as 13.83%. Afterwards, a number of thin film cell designs were proposed, with corresponding simulation outcomes. Besides this, saturation in short-circuit current density (Jsc) and open-circuit voltage (Voc) with increasing absorber layer thickness was illustrated, in light of relevant simulation results.

References
Simulation of a GaP/ Si Heterojunction Thin Film Solar Cell on Glass Substrate

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**Index Terms**

Computer Science

Power Electronics

**Keywords**

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