

عنوان مقاله:

Improving the optical properties of thin film plasmonic solar cells of InP absorber layer using nanowires

محل انتشار:

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نویسندگان:

Abedin Nematpour - *Department of Nanoelectronics, Nanoscience and Nanotechnology Research Center, University of Kashan, Kashan, Iran*

Mahmoud Nikoufard - *Department of Electronics, Faculty of Electrical and Computer Engineering, University of Kashan, Kashan ۸۷۳۱۷-۵۱۱۶۷, Iran*

خلاصه مقاله:

In this paper, a thin-film InP-based solar cell designed and simulated. The proposed InP solar cell has a periodic array of plasmonic back-reflector, which consists of a silver layer and two silver nanowires. The indium tin oxide (ITO) layer also utilized as an anti-reflection coating (ARC) layer on top. The design creates a light-trapping structure by using a plasmonic back-reflector and an anti-reflection coating layer on top, which increase the light absorption in the solar cell. The enhancement of light trapping was observed in the proposed configuration of the solar cell with an ۱۰۰۰ nm thick InP absorption layer, which improved the short-circuit current density and efficiency. The highest short-circuit current density and efficiency were determined ۳۲.۰۷ mA/cm^۲ and ۲۶.۶%, respectively, for the nanowire radiuses of R₁=۵۰ nm and R_۲= ۱۲۰ nm. Therefore, this structure improves the ultimate efficiency of ۳۸% compared with the InP-based solar cells counterparts.

کلمات کلیدی:

Efficiency, InP Material, light trapping, Nanowire, Plasmonic Solar Cell, Short-Circuit Current Density

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