

عنوان مقاله:

Electrical Properties of ITO/Al<sub>0.7</sub>Ga<sub>0.3</sub>As/ITO Solar Cell With and Without Defects

محل انتشار:

مجله انرژی تجدیدپذیر و محیط زیست، دوره 11، شماره 2 (سال: 1403)

تعداد صفحات اصل مقاله: 5

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خلاصه مقاله:

In this research paper, the electrical properties of an ITO/Al<sub>0.7</sub>Ga<sub>0.3</sub>As/ITO solar cell were investigated using SILVACO ۲D-Atlas. Characterization was performed through static characteristics (I-V) and (P-V) at room temperature and under standard spectrum AM<sub>1.5</sub> illumination. Open-circuit voltage (VOC), short-circuit current (ISC), maximum power (Pmax), and fill factor (FF) were also extracted from these characteristics. To obtain more credible results, mid-gap defects were included in the simulation, and a comparison was made with a silicon-based solar cell. The results showed that the presence of mid-gap defects in the solar cells has a detrimental effect on their electrical performance, increasing recombination and reducing the current of the solar cell. Additionally, the inclusion of defects enhances the realism of the simulation results. Despite the inclusion of defects, the ITO/Al<sub>0.7</sub>Ga<sub>0.3</sub>As/ITO solar cell maintains its ideality due to its high fill factor (FF) of ۸۰.۷۳%. The results obtained in this study will serve as a reference for choosing appropriate semiconductor materials for solar cells, especially for use in hostile environments

کلمات کلیدی:

Si, Al<sub>x</sub>Ga<sub>1-x</sub>As, III-V Solar cells, Mid-gap defects, Recombination, Static characteristics and Electrical parameters

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