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Title:	Modeling and Performance Analysis of a Transparent Multilayer Solar Cell
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Published Journal Name:	AIUB JOURNAL OF SCIENCE AND ENGINEERING
Type of Publication:	Journal
Volume:	22 Issue 3
Publisher:	American International University-Bangladesh (AIUB)
Publication Date:	December 2023
ISSN:	1608-3679
DOI:	https://doi.org/10.53799/ajse.v22i3.580
URL:	https://ajse.aiub.edu/index.php/ajse/article/view/580
Other Related Info.:	Page 231-239

Citation: Maria Sultana Rupa, M.Tanseer Ali, Mohammad Abdul Mannan and Mehedi Hasan, “Modeling and Performance Analysis of a Transparent Multilayer Solar Cell,” AIUB Journal of Science and Engineering (AJSE), Vol. 22, No. 3, pp. 231 - 239, December 28, 2023.





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Abstract:

Transparent solar cells have emerged as a promising frontier in renewable energy research, offering the dual functionality of generating electricity while maintaining transparency. Five layers of InAs/InSb/AlGaAs/GaN/Si are incorporated into the proposed model structure which takes the properties of the source materials into consideration. Simulations of electromagnetic waves are used to evaluate optical and electrical properties. The cell is assumed to function at room temperature in the simulated settings. The I-V curve's fill factor (F.F.) of 0.6531 corresponds to a maximum conversion efficiency of 15.2655%, according to the data. Furthermore, at 530 nm, this combination and device configuration show a very good transparency of up to 60%.

Keywords:

Transparent Solar Cell, COMSOL Multiphysics, Si, InAs, InSb, AlGaAs, GaN.