

Review Form 3

Journal Name:	Journal of Energy Research and Reviews
Manuscript Number:	Ms_JENRR_130136
Title of the Manuscript:	Numerical Analysis of Absorber Layer, Thickness, Bandgap, Temperature, and Interface Defect Density of Perovskite Solar Cells by Device Simulation
Type of the Article	

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PART 1: Comments

	Reviewer's comment	Author's Feedback <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimum of 3-4 sentences may be required for this part.	This manuscript investigates the performance of lead-based perovskite solar cells (PSCs) using SCAPS-1D simulations. It explores the effects of critical parameters such as absorber layer thickness, bandgap, temperature, and interface defect density on power conversion efficiency (PCE). The study provides a comprehensive analysis of these parameters, highlighting the role of specific materials and configurations in improving device stability and performance.	
Is the title of the article suitable? (If not please suggest an alternative title)	Yes	
Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.	The abstract is informative but verbose. Consider focusing on the key findings and their implications. Suggested Revision: Condense descriptions of materials and methods while retaining critical results (e.g., "The optimized absorber layer thickness of 1.0 μm achieved a PCE of 28.46%").	We have some kind of editing work on the abstract as suggested by this reviewer
Is the manuscript scientifically, correct? Please write here.	Yes	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.	Some additional refs are recommended.	

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<p>Is the language/English quality of the article suitable for scholarly communications?</p>		
<p>Optional/General comments</p>	<p>While the research is relevant and contributes to the ongoing efforts to optimize PSCs, several aspects of the manuscript require significant revision to enhance its clarity, scientific rigor, and overall impact. Below are detailed comments and suggestions for improvement. The manuscript's structure is logical, but some sections, particularly the introduction and methodology, could benefit from improved coherence and conciseness. The scientific language is occasionally unclear, making the findings less accessible to readers.</p> <ul style="list-style-type: none"> - Technical Depth: While the simulation results are valuable, the lack of in-depth discussion on the underlying mechanisms limits the scientific impact. Further analysis of the trends observed in PCE concerning thickness, bandgap, and defect density is essential. - Figures and Tables: Figures and tables are not adequately referenced in the text, and some of them (e.g., Figure 1 and Table 1) lack detailed captions and explanations. Ensure all visual elements are properly integrated into the discussion. - The introduction provides a solid overview of PSCs but could better establish the novelty of this study compared to existing research. <ul style="list-style-type: none"> o Include a summary of recent advancements in SCAPS-1D simulations for PSCs to frame the study's contribution. o Address the environmental implications of using platinum as a back contact, as this could contradict the goal of reducing toxicity. - Methodology: <ul style="list-style-type: none"> • The methodology section provides detailed descriptions of SCAPS-1D and device architecture but lacks a justification for the chosen parameters. <ul style="list-style-type: none"> o Explain why specific materials (e.g., Cu₂O, TiO₂) and their configurations were selected. o Provide references for the material parameters listed in Table 1. - Results and Discussion: <ul style="list-style-type: none"> • The results are presented in isolation without adequate interpretation of the observed trends. <ul style="list-style-type: none"> o Discuss why PCE increases with absorber thickness up to 1.0 μm but declines thereafter. Include potential implications for charge carrier dynamics. o Analyze the temperature dependence of PCE, linking it to thermal stability concerns in MAPbI₃. o The bandgap findings for HTL and ETL could benefit from a comparison with experimental studies or theoretical predictions. - Figures and Tables: <ul style="list-style-type: none"> • Enhance Figure 1 by clearly labeling the device layers and including a legend. • Add units and clarify abbreviations in Table 1 for improved readability. - References There are some informative recently published articles that can help the authors to enrich the discussion regarding the device performance over different parameters variation. These are strongly recommended: https://link.springer.com/article/10.1007/s11664-020-08524-w https://doi.org/10.1117/1.JPE.10.024504 https://scholar.google.com/scholar?oi=bibs&cluster=17934032817176076726&btnI=1&hl=en https://link.springer.com/article/10.1007/s10825-021-01779-4 https://link.springer.com/article/10.1007/s12648-020-01888-z 	<p>We have agreed with the reviewer's comments and effect some changes in the methodology.</p>

PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p>Are there ethical issues in this manuscript?</p>	<p><i>(If yes, Kindly please write down the ethical issues here in details)</i></p>	