High-efficiency Crystalline Silicon-based Solar Cells Using Textured TiO_2 Layer and Plasmonic Nanoparticles

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We would like to express my sincere gratitude to the anonymous reviewer for his time and valuable comments. We have revised the proposal by seriously considering the comments provided by the reviewer. The second and final format proposal is uploaded. Our point-to-point response is given below, and the modifications are mentioned in the manuscript.

Response to the Reviewer Comments

1. Page 1/12, Line 35-37: the authors claimed that "On the other hand, the indirect bandgap of the crystalline silicon reduces the recombination rate and open-circuit voltage, Voc, which reduces the solar cell's overall efficiency, μ [3]". Please give the more information that why the indirect bandgap of the crystalline silicon reduces the recombination rate and open-circuit voltage. Please also check the correct symbol of "μ" for the solar cell's overall efficiency.

A clear sentence has been added in lines 35-40.

Thank you for your comment.

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2. Please check the correctness of Equation (2), particularly to the term (Dp/ni)2.

The main equation is: $V_{OC} = V_{Th} \ln [\frac{np}{{n_i}^2}]$ as illustrated in Equation number 3 in reference [27].

Hence and by considering that, the photogenerated excess electron and hole densities are balanced, the values Δp and Δn are equal, $\Delta p = \Delta n$. Furthermore, at high injection level, we can assume that n=p=Δp, and Equation (2) in the paper can be obtained.

A clear sentence has been added in lines 139-142.

Thank you for your comment.

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3. Please give the unit of Plasma frequency, Resonant frequency, and Damping frequency on the Table 1.

The units are added.

Thank you for your comment.

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4. Please give the definition of strength as showing in Table 1, on the revise manuscript.

The table has been modified.

Thank you for your comment.

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5. The authors claimed that “However, the maximum short circuit current density and consequently the power conversion efficiency are produced by our proposed structure with values of 61.9 mA/cm2 and 30.6%, respectively”. Can authors to identify what kinds of contribution (textured TiO2 layer, or back reflector with gratings, or plasmonic nanoparticles, or all combinations) on the short circuit current density or power conversion efficiency to achieves such high values?

A clear sentence has been added in lines 430-434.

Thank you for your comment.
