# Author’s Response to the Review Comments

***Journal* : Jurnal Elektronika dan Telekomunikasi**

***Title of Paper* : Effect of Geometrical Structure to the Performance of Monolithic Dye-Sensitized Solar Cells**

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We appreciate the time and efforts by the editor and referees in reviewing this manuscript. We have addressed all issues indicated in the review report, and believed that the revised version can meet the journal publication requirements. We have included the line numbers in the revised manuscript to help the reviewers identify our changes.

| **Comment** | **Response** | **Location of Response in Revised Manuscript** |
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| **EDITOR’S COMMENTS** |  |  |
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| **REVIEWER 1 COMMENTS** |  |  |
| In **Introduction,** authors explained about the different DSSC and conventional Silicon Solar Cell. However, the differences monolithic and conventional structures in DSSCs were not explained well. Please explain more detail the differences between these two structures. | We have added the explanation of the differences monolithic and conventional structure of DSSC. | Introduction. 4th paragraph. |
| **Figure 1;** please indicate this picture as cross section structure of monolithic DSSCs to make it easier for readers. | We have revised based on the recommendation. | Figure 1. |
| **Figure 4;** please indicate this picture as top view structure of monolithic DSSCs to make it easier for readers. | We have revised based on the recommendation. | Figure 4. |
| In Table 1, it is better to display current density than current for easier understanding. | We have revised based on the recommendation. | Table 1. |
| The I-V curve (Figure 6) is not clear. Please extend the x and y axis, also use tick labels to get clearer images for analysis. | We have revised based on the recommendation. | Figure 5 |
| Abstract is not clear about this work. Please state clearly the main idea of this work in the abstract. | We have revised based on the recommendation. | Abstract |
| Authors mentioned that the device B is better than device A because device B has more interfacial contact between TiO2 and carbon layer which lead to recombination. However, it is not consistent with the result of device C. Device C should be the highest because it have no direct contact between TiO2 and carbon layer (also FTO), then suppressed recombination | It probably caused by direct contact between ZrO2 layer with the edge of anode FTO in structure C as shown in Figure 4c so that the performance is not better than the performance of structure A and B. | - |
| The result showed (Table 1) that device A is better than device B. However, the difference is very little. It is hard to say that the device A better than device B. It will be alright, if authors completed with statistical data, including margin of error. | Considering due to the limitations of materials, we only make a few devices for each geometrical structure, and we assumed the total devices that we used is less than ideal for statistical data. The data which we show in this paper is taken from the best performance device for each geometrical structure. | - |
| It has been discussed that the device’s performance related to the different geometrical dimension, such as different area between TiO2 and ZrO2. In reviewer opinions, it is better if the similar size both TiO2 and ZrO­2 also investigated to get clear confirmation that the size is the main role key in this work. | From the discussion, authors concluded that additional investigation which related with the similar size of both TiO2 and ZrO2 is unnecessary considering that the geometry size of TiO2 must be wider than ZrO2 so that the electrolyte and carbon will not directly contact with anode FTO that caused electron recombinati-on without going through external circuit. | - |
| Based on the **Figure** **5,** the EQE spectrum was not consistent with the device performance, especially for current. Based on the EQE image, the current density of the device C should be better than device B. The current density of device B should not close to device A. Authors must be careful to analyze and discuss their data. | Authors regret the lack of accuracy in making the EQE curve. The data of structure B has been exchanged with structure C. | Figure 6 |
| **REVIEWER 2 COMMENTS** |  |  |
| The presented figures are not enough to describe the scientific contents of the manuscript. For example, the cross-section in Fig. 1. doesn't represent the geometrical variables of Fig. 4 (a-c), it almost similar to the Fig. 4(d), yet still it is not the same structure. The top view structures of Fig. 4 are also hard to be judged scientifically. The reviewer suggested the cross section in Fig. 4 should be added. If only from top view, there are several critical points can be questioned.  The author(s) claimed that the ZrO2 layer is utilized for (1) the transportation of electrolyte to dyed porous TiO2 layer; (2) as a spacing insulator to separate dyed TiO2 layer and carbon layer electrically [5]-[6]. Nevertheless in Fig. 4(a-b) the ZrO2 does not insulate dyed TiO2 and carbon because it is narrower compared to the TiO2. Is the carbon floating above the non-FTO layer? But, why structure a and b show the better performance? please describe the comparative mechanism and its physical meaning. | Fig. 1 is made to show the layers in the structure of monolithic DSSC and did not represent the structures in Fig. 4. But, we have added the cross section view of monolithic DSSC structure in Fig. 4 as recommendation.  From Fig. 4 (the cross section view of monolithic DSSC structures) shows that there is no direct contact between ZrO2 and (or) carbon with anode FTO in structure A and B. Meanwhile, there is direct contact between ZrO2 with the edge of anode FTO in structure C, while structure D has the most direct contact between ZrO2 and anode FTO. | Figure 4 |
| Author(s) explained that Table 1 is summarized of the photovoltaic parameters measurements. However, the IV curve is presented in the last figure. Therefore the data order is not systematically presented. Please discuss it in order. | We have revised based on the recommendation. Figure 6 (IV curve) has been swapped into Figure 5. | Figure 5 |
| The steep IV curves of the presented DSSC doesn't represent a good photodiode device characteristics (solar cell is a photodiode device), where there is no forward and reverse bias characteristics in the operation mode, it's similar to a resistive device. Why? Please discuss this issue in the revised manuscript. | The measuring instrument that we used (National Instrument) only has typical measurement program for solar cell device’s I-V characteristics measurement that has no reverse and forward bias operation mode, so it can’t be used to measure photodiode ideality. Authors assumed that the IV curve shape didn’t represent good DSSC characteristics because of the low fill factor. | In Result and Discussion. 2nd paragraph after Table 1. |
| The author(s) claimed the device structure a demonstrated the best performance. What is the standard deviation (SD) of presented table 1? because it is only 1.5% different compared to the device b. the SD values give a significant justification to the claimed performance. | Considering due to the limitations of materials, we only make a few devices for each geometrical structure, and we assumed the total devices that we used is less than ideal for statistical data. The data which we show in this paper is taken from the best performance device for each geometrical structure. However, we have added in Table 1, the average efficiency and deviation standard each geometrical structure as a comparison. | Table 1. |
| The English should be improved, several grammatical errors are found. For example "A thicker layer effects a stronger insulation that results in a higher shunt resistance" the word of "effects" doesn't fit as the verb in the sentence. The reviewer assumes it is "affects instead of effects" | We have revised based on the recommendation. | All |