



SDI Review Form 1.6

Journal Name:	Physical Science International Journal
Manuscript Number:	Ms_PSIJ_27566
Title of the Manuscript:	Chemical and Electrochemical Deposition of Ag onto Si for Fabrication of Si Nanowires and the Seebeck Effect Characterization
Type of the Article	Review paper

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	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)
Compulsory REVISION comments	<p>The paper reports some results by the authors, but not a review of literature results in the field. So I could characterize the paper as a contributed and not a Review paper. Concerning the content of the paper, many important parameters in the fabrication and characterization of the samples are missing. Consequently, the discussion of the obtained results concerning the Seebeck coefficient is questionable and not supported by the experiment. More specifically:</p> <p>a) The structure and morphology of MACE Si NWs depend strongly on the resistivity of the starting Si wafer. MACE of lightly doped p- or n- type Si results in compact Si NWs, while for a highly doped substrate the SiNWs are porous. The resistivity of the starting Si wafer is thus a necessary parameter in order to understand the obtained results. The structure of the Si NWs is important for the understanding of the Seebeck coefficient.</p> <p>b) The length of the Si NWs is another important parameter. The authors</p>	<p>The authors agree with this comment that “the paper reports some results by the authors, but not a review of literature results in the field. So I could characterize the paper as a contributed and not a Review paper.” In the revised version, we marked this paper as “Original research paper”.</p> <p>We agree with the reviewer and add the information of the resistivity in the revised paper as shown in the Materials and Experimental Procedures section.</p> <p>The top view of the SEM images are intent to show the porous features of the</p>



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	<p>should measure this length and give the corresponding result for the different samples. The top view SEM images are not so important for the understanding of the Seebeck measurements. More important are cross sectional SEM images, which can reveal the Si NW length, diameter and structure. Without knowing the length of the SiNWs, the Seebeck measurements cannot be fully understood and explained.</p> <p>c) I do not understand the SEM image of Fig. 4. What is it shown? The oxidation state of the surface cannot be revealed by an SEM image. So the statement that we see an oxidized surface is completely wrong.</p> <p>d) The authors speak about Ag dendrites, however they do not show such dendrites in their paper. On the contrary, they state that there is no Ag on the surface of some of the samples. Where did Ag go? In the solution, as they claim? I do not really believe it. There is no evidence for that. The proposed etching mechanism is not fully explained and understood.</p> <p>e) The figures of the EDX results are so small that we cannot see them. It is hard to see the corresponding peaks. By zooming on the images we cannot clearly resolve the axes.</p>	<p>processed Si. A cross section image is not added because in earlier work performed by Zhang et al. (Nano Energy (2015) 13, 433–441) already address the morphology evolution clearly. We believe that the Si NW length, diameter and structure are not the focus of this work.</p> <p>Due to oxidization, the Si loses electron and some of the Si dissolved into the solution. Therefore, some etching pits and plates shown in Figure 4(a). That is the explanation of the facets formation in the SEM image as shown by Figure 4(a).</p> <p>Although the Ag dendrites are not shown here. But some other authors showed such dendrites in their paper. Please refer to [20] in the paper. We believe that adding such information may not provide any new results.</p> <p>We re-organized the EDX results and separated it from the SEM images.</p>
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	<p>f) Concerning the Seebeck measurements, the registration of a Seebeck coefficient as a function of time is not correct. The authors should measure the mean voltage difference and the mean temperature difference from which the Seebeck coefficient is deduced.</p> <p>g) I do not understand the discussion on S SiAg60 ~ 3 S bulk. From the given numbers the increase in S is much higher.</p> <p>h) The Seebeck coefficient is an important parameter, however the only knowledge of this parameter is not enough in order to characterize the thermoelectric properties of a material. For the same material, the thermal and electrical conductivity should be known. This should be pointed out in the discussion and conclusions. The phrase in the conclusion that "based on the results... the thermoelectric performance improvement ... is promising..." is not correct.</p>	<p>It is our intention to observing the Seebeck coefficient as a function of time. Therefore the time-dependent Seebeck coefficient changes are plotted.</p> <p>The discussion is on how the etching time affects the behavior of the etched silicon material. It is noted that the increase in S is much more complicated.</p> <p>The authors agree with the reviewer on this issue. It is well known that Seebeck coefficient is an important parameter to show thermal power of energy conversion materials. As a first hand important means, this parameter can be used to objectively evaluate the thermoelectric properties of a material. It is true that some other tests such as thermal conductivity, electrical conductivity may be presented in our future work to provide more comprehensive understanding of the thermoelectric behavior of this nanowire.</p>
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		