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Montpellier, 17 of August 2020.

Vineeta Bajaj, Ph.D.  
Review Editor  
JoVE journal

On behalf of all the co-authors I thank you very much for your positive feedback and constructive reports about the manuscript JoVE61766 entitled “Epitaxial Nanostructured  $\alpha$ -Quartz Film on Silicon: From Material to New Devices”.

Following your recommendation, we have carefully considered and addressed the questions and comments raised by the three reviewers. New and updated figures have been added in this revised version of the paper, and we have highlighted in red background the novel modifications according to the response to reviewer and editorial comments.

First reviewer’s report:

**The work here is clearly presented and the protocol used works with demonstrated results. I’d recommend this manuscript to be accepted after another round of copy-editing.**

We thank the reviewer for the careful reading of the manuscript and for the positive evaluation.

Second reviewer’s report

We appreciate the comments and recommendations of the second reviewer. As a result, we will address all these observations point-by-point.

**1.The title should rather be: Epitaxial Nanostructured  $\alpha$ -Quartz Film on Silicon: From the Material to New Devices**

We agree with the referee and we thank he/she for this observation, we have modified the title according to the referee suggestion “**Epitaxial Nanostructured  $\alpha$ -Quartz Film on Silicon: From the Material to New Devices**”.

**2. SOI needs to be defined the first time is used**

We thank the reviewer for this observation, the SOI acronym has been defined the first time is used.

**3. protocol 3.2.2: "...until the atmospheric conditions are stable". Not clear what that means**



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We thank the reviewer for this observation, the text has been clarified.

**4. protol 3.2.3: I interpret there is only one dip. is that right? what is the thickness per dip obtained in the end?**

Yes, protocol 3.2.3 refers to a single dip coating process. We agree the reviewer remark; the text has been modified accordingly. The Thickness per dip has been included in protocol 3.2.4. which is 200 nm.

**5. protocol 3.2.5: i would indeed change protocol 3.2.3. I would say "perform a dip" since talking about sequence is misleading, as evidenced by my previous comment.**

We have changed this information following the recommendation of the referee.

**6. protocol 3.3.3: is this done with two ovens? if not the heating ramp from 70 to 140C should be given**

Yes, the protocol 3.3.3 is done with two ovens at the indicated temperature values.

**7. protocol 4.1.3: Do the samples need to be flat?**

No, the sample can be accommodated in the ceramic boat in different configurations i.e. horizontal, tilted or flat...

**8. For all the lithographic steps, the details on the mask are missing. Also, it would have to be precised which side of the sample is being treated since it is not necessarily obvious, although the figures help to visualize it.**

The top side of the sample is quartz side and bottom side of the sample is 675  $\mu\text{m}$  thick p doped silicon (conductivity should be between 1 and 10  $\Omega/\text{cm}$ ). We fabricated the cantilever on quartz side. The details of lithographic mask have been included in the main manuscript (protocol 6).

**9. I m a bit confused by the structure of the cantilevers and the chip and how it is actuated. I indeed do not understand or visualize why the contacts are referred to as top and bottom. If we focus on figure 1h, it is not clear from the description and image how the cantilever is actuated. The authors refer to top and bottom electrodes but both appear to be top electrodes in this scheme. It is true that one touches the Si but is also in contact with the quartz layer. Maybe a 3d view or other alternative view would help see the interconections between the different layers and their continuity etc..**

The bottom electrode is the 2  $\mu\text{m}$  thick Silicon device layer. This layer remains below and in contact with the piezoelectric epitaxial quartz film after the HF etching. Therefore, the quartz cantilever can be activated by applying an alternative current (AC) between both electrodes. i.e. Pt top electrode and Si(100) bottom electrode. We have included a set of FEG-SEM images in figure 1 to simplify the view of electrodes and the heterostructure of this system.

**10. In figure 1i why SiO2 to the left is not etched??**



It is true that a part of the surrender area is etched, but this is just a schematic view of the etching process focused only in the cantilever part. We believe that with the new figure 1 this feature is less confusing.

**11. The caption of figure 2e seems not to be correct.**

Thank you for this remark. This error has been corrected in the new version of the manuscript.

Third reviewer's report

We thank the reviewer for the careful reading of our manuscript and for providing some corrections and suggestions that have been incorporated.

All the authors sincerely hope that after correcting and clarifying the document and addressing the reviewers' observations and criticisms, the paper will be suitable for publication in JoVe .

I look forward to hearing your decision.

With best regards,

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