

For research article

Response to Reviewer 3 Comments

Manuscript Title: Design, Fabrication, and Characterization of Inkjet-Printed Organic Piezoresistive Tactile Sensor on Flexible Substrate

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Summary:

Thank you very much for taking the time to review this manuscript. We thank the reviewer for their comments and feedback on our first submission. We have made numerous changes to the manuscript and organized it well to address your comments. Please find the detailed responses below and the corresponding revisions/corrections highlighted/in track changes in the re-submitted files.

Reviewer 3

The authors presented a novel tactile sensor with a “fingerprint” design that exhibits good durability and repeatability. However, the manuscript still has some problems that need to be revised.

Comment 1. The author should calculate the curing time after printing the electrodes when analyzing the process time; after all, the electrodes prepared by sputtering and etching processes do not require a long curing time.

Response 1:

As rightly stated, sputtering and etching processes do not require a long curing time while the curing time for the printed electrode in the oven could be from 30 minutes to 15 hours depending on the predetermined characteristics of the tactile sensor needed. Also, the curing time in the oven could be reduced to a matter of seconds using the IPL (intense pulse light) presented within the Nexus fabrication platform.

We made a clarifying statement about this in Section 3.6 in lines 333-335.

Comment 2. The experimental details in [y] mentioned by the authors in line 354 is confusing.

Response 2:

Thank you for your keen observation, it has been duly addressed in the manuscript in line 401.

Comment 3. The author should have given a brief description about the principle of the sensor and compare your own results explicitly with what has been published in the past literature (in a table, for instance) and to show the benefit(s) and shortcomings of their device.

Response 3:

The principle of the sensor is based on the piezoresistivity of the PEDOT:PSS organic polymer changing its electric properties under the strain due to applied force. The PEDOT:PSS is applied connecting the open circuit patterned fingerprint tactile sensors laminated back-to-back to form a half Wheatstone bridge circuit eliminating thermal and temperature drift also preventing it from being exposed to moisture.

The description of the sensor's operation principle is added to the chapter 1, section 1.3, page 3, line 103-128.

The table below shows the comparison between the tactile sensors fabricated in the cleanroom [41-43] and with the help of Nexus system. Table is added to manuscript in chapter 5, page 19, line 581.

Comparison	Cleanroom Sensors	Fingerprint sensors
Fabrication	<10hours	<1hours
Yield	Averagely 75%	100%
Ease of manufacture/ Fab. Process complexity	complex	simplified
Substrate - Geometry/ Surface Area	limited by silicon wafer	Custom
Reliability (indentation cycles)	>100	180,000
Durability	wearing off terminals (fragile metal electrodes)	printed electrodes more resistant to the wear
Spatial Resolution	N/A	>1mm
Cost	Averagely (\$2172)	Averagely (\$60)

