

## *Supporting Information*

### **Biomimetic multifunctional E-skins integrated with mechanoluminescence and chemical sensing abilities**

*Xin Yang,<sup>a,b</sup> Xu Zhang,<sup>b</sup> Qingbao Guan,<sup>\*a</sup> and Xinxing Zhang<sup>\*a,b</sup>*

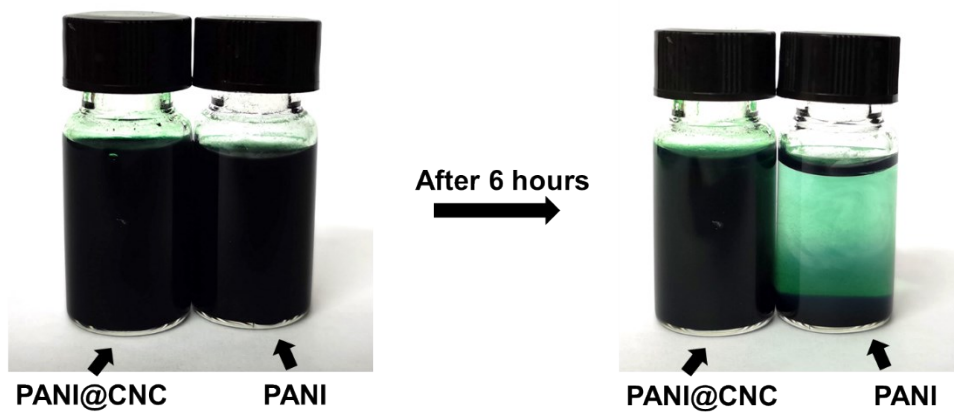
*<sup>a</sup> State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, Donghua University, Shanghai 201620, China*

*<sup>b</sup> State Key Laboratory of Polymer Materials Engineering, Polymer Research Institute of Sichuan University, Chengdu 610065, China*

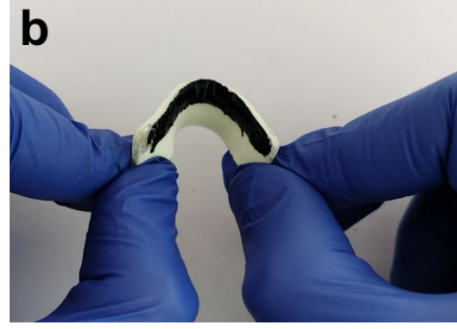
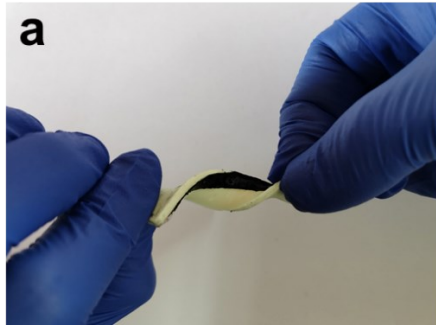
E-mail: [xxzwwh@scu.edu.cn](mailto:xxzwwh@scu.edu.cn), [qbguan@dhu.edu.cn](mailto:qbguan@dhu.edu.cn)

---

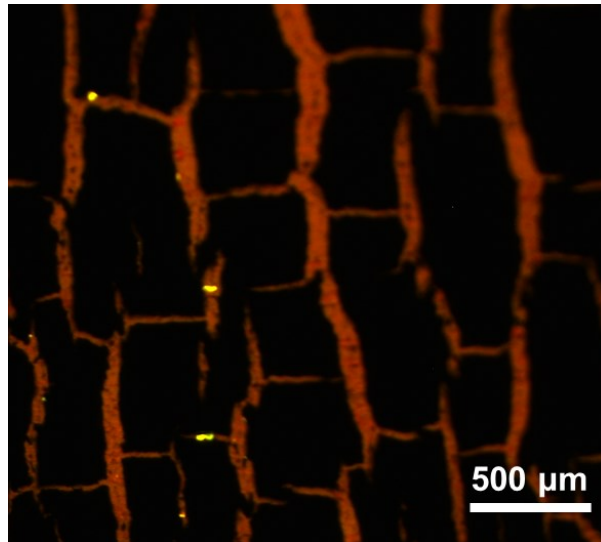
*\*Corresponding author: Xinxing Zhang and Qingbao Guan  
E-mail address: [xxzwwh@scu.edu.cn](mailto:xxzwwh@scu.edu.cn), [qbguan@dhu.edu.cn](mailto:qbguan@dhu.edu.cn)  
Tel: +86-28-85460607 Fax: +86-28-85402465*



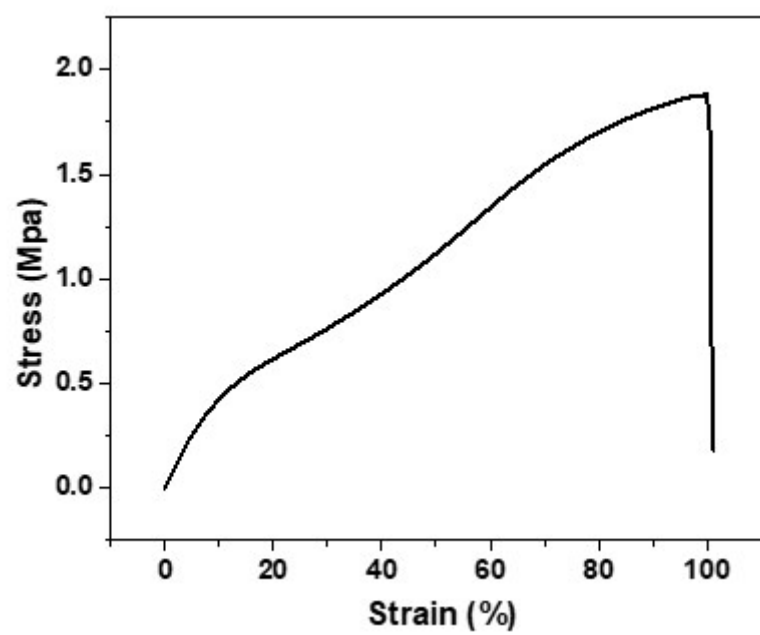
**Figure S1.** Digital pictures of PANI@CNC and neat PANI before and after 6 hours.



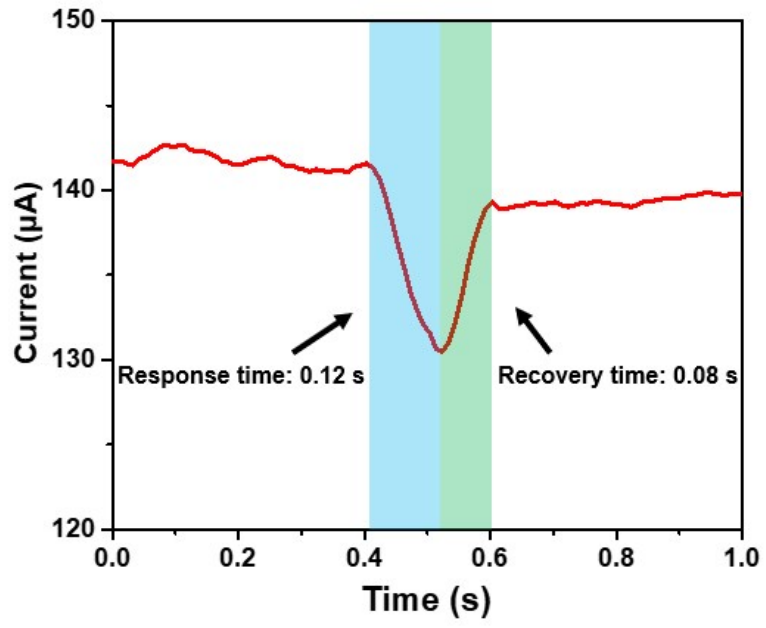
**Figure S2.** Digital pictures given the twisting (a) and bending (b) process of multifunctional sensor.



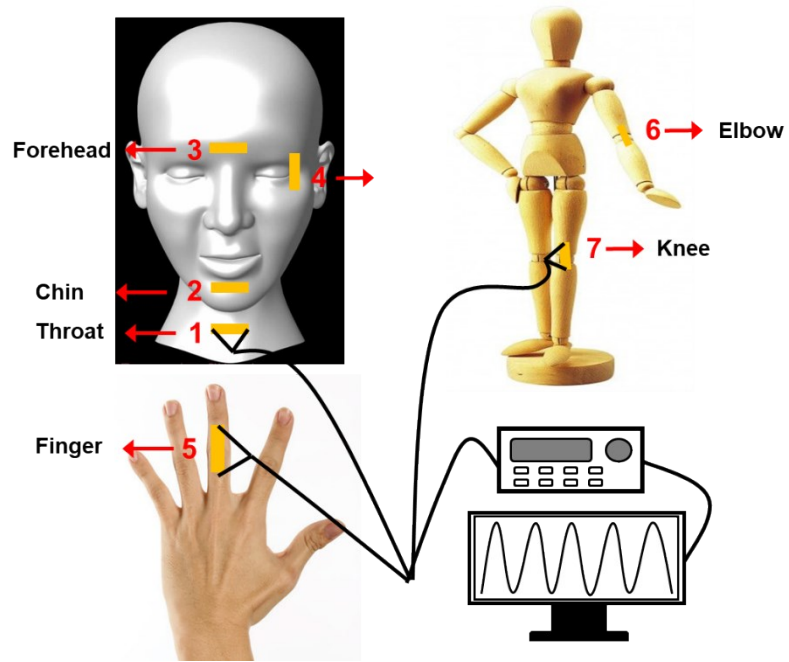
**Figure S3.** The mechanical micro-crack junctions in the PANI@CNC layer of the multifunctional sensor under the strain of 50%.



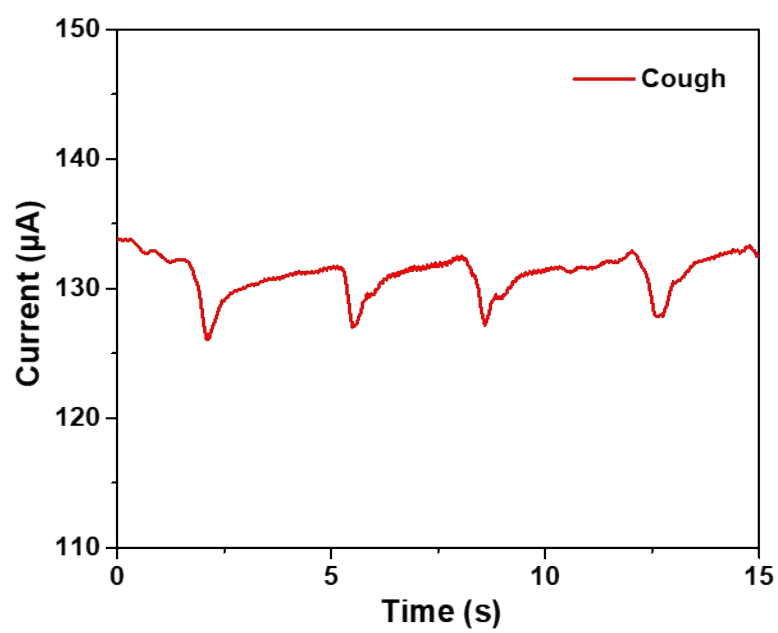
**Figure S4.** Stress–strain curves of the multifunctional sensor.



**Figure S5.** Instant response time and recovery time of the strain sensor.

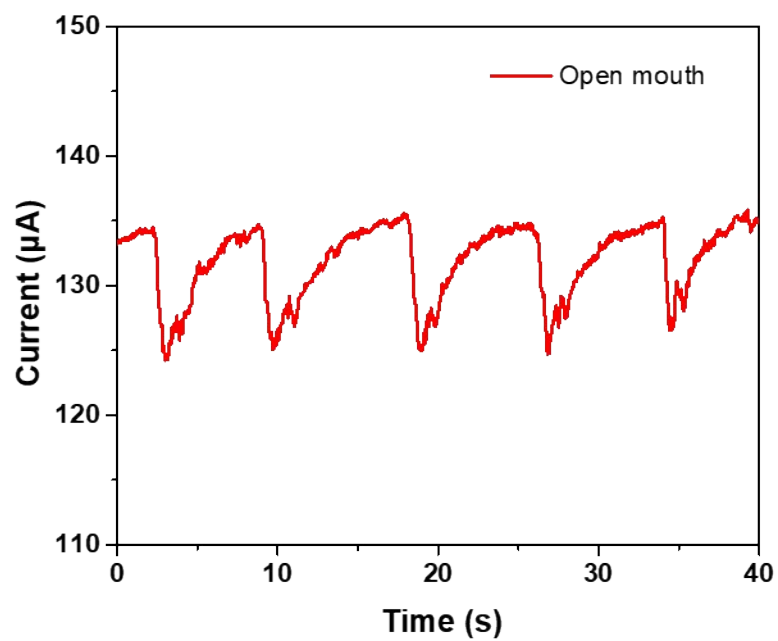


**Figure S6.** Schematic illustration of test scenarios based on the strain sensors.

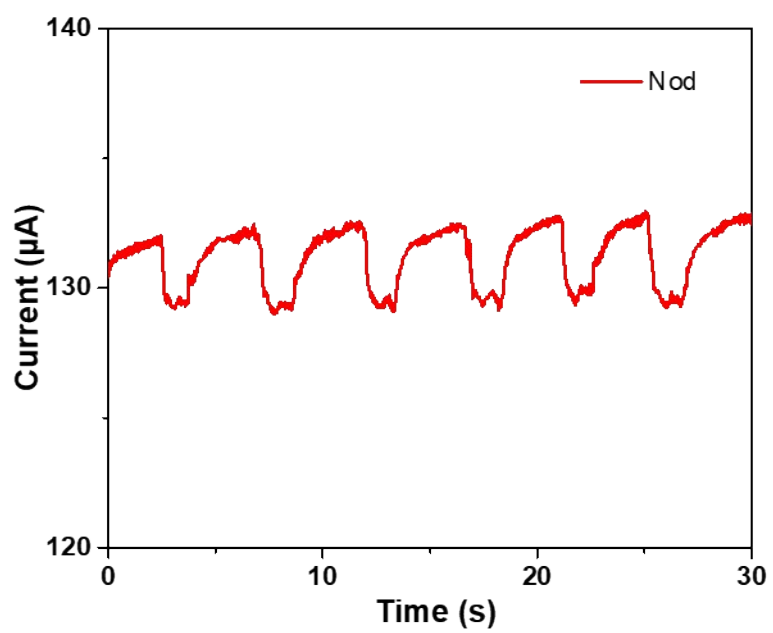


**Figure S7.** The current response of the sensor to monitor coughing.

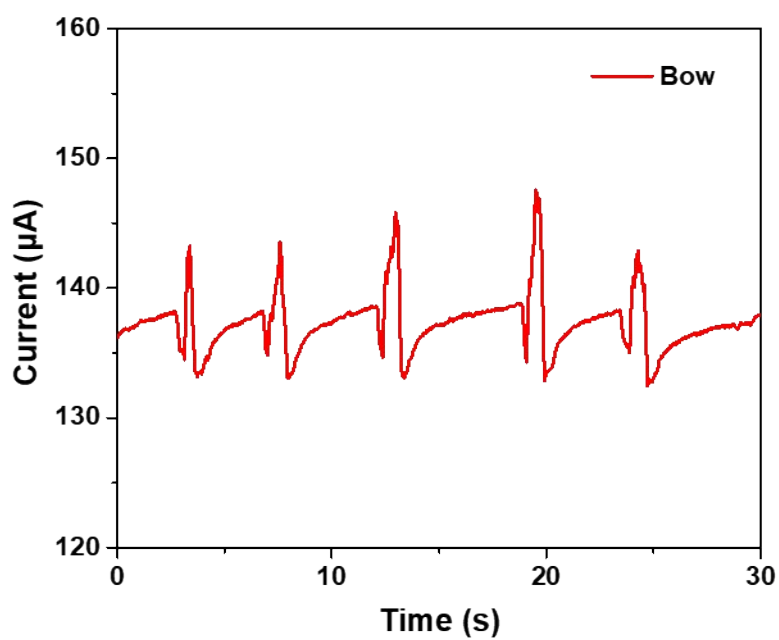




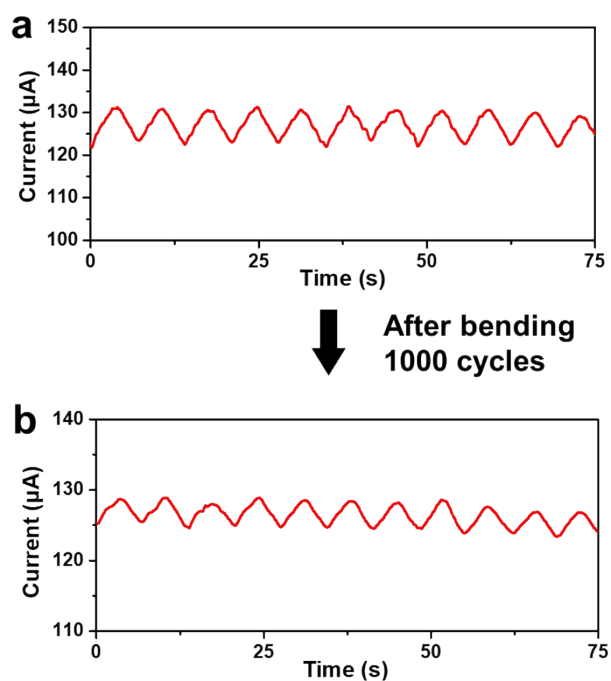
**Figure S8.** The current response of the sensor to monitor the facial expression of opening mouth.



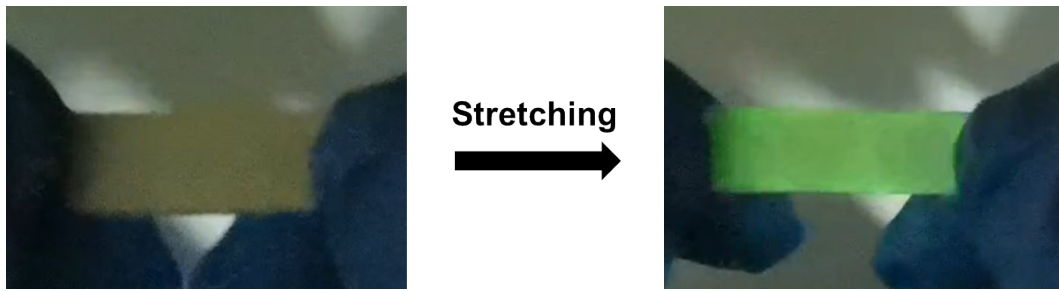
**Figure S9.** The corresponding current response to the activity of noding by a puppet.



**Figure S10.** The corresponding current response to the activity of bowing by a puppet.



**Figure S11.** Corresponding current response under the strain of 5% before and after 1000 cycles of bending.



**Figure S12.** Digital pictures of the mechanoluminescent substrate of multifunctional sensor under stretching