TITLE: Facile fabrication of self-healing temperature-sensitive sensor based on ionogels and its application in detection human breath

Dear Editor,

Thank you very much for your constructive comments. Attached please find our revised version of the above manuscript. The comments of the referees are taken into account and the corresponding amendments are made in the text and highlighted in red. In a separate attachment we send the reply letters to the referees.

We hope that the revised manuscript is now suitable for its publication.

Yours sincerely,
Tao Chen, Prof. Dr.
Jiangsu Provincial key of Laboratory of Advanced Robotics & Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, Suzhou 215021,
Reply on Referee Reports

We would like to thank you for your constructive comments, which really helped in improving the manuscript. The comments and questions all have been taken into account in revising the manuscript as follows.

**Referee: 2**

1) In the Introduction, the AA state that ionogels show poor stretchability and weak self-healing property. The referee does not agree with the above statement as many papers have been published about ionogels and report the self-healing ability of these materials (see for example ACS Applied Materials & Interfaces 2018, 10, 5871; Journal of Colloid and Interface Science 2017, 487, 130-140; ACS Nano 2018, 12(2), 1296-1305; Chemistry – A European Journal 2016, 22(32), 11269-11282; Chemistry – A European Journal 2017, 23(64), 16297-16311; Green Chem. 2018, 20, 4260; Journal of Colloid and Interface Science 2018, 517, 182-193.).

Accurate descriptions and more references were added in the introduction to describe the development and properties of the ionogels.

“excellent flexibility, high thermal stability, high ionic conductivity, nonvolatility and biocompatibility [6-8]. They have shown intensive applications in fuels [9], radical scavenging activity [10], antibacterial activity [11], environmental remediation [12] and flexible electric devices [13-15], particularly in the wearable sensor’s fields [16-18]. Recently, great achievements have been obtained in the fabrication of materials and the construction of the wearable sensors based on the ionogels [19, 20]. “However, most reported wearable sensors often focus on the single performance such as sensing pressure or stretching or temperature [24, 25].” were added.

2) The Introduction is quite general and does not allow having a general idea about the topic of the manuscript and the aim of experimental work. For the above reasons, it should be re-written deepening the above aspects;

Thanks for your good suggestion. The introduction has been re-written to describe the topic of the manuscript.

3) Interestingly, DSC and TGA analysis were reported, but details of experimental
methodologies are not reported: They should be inserted. On the other hand, also methodology to obtain Raman and IR spectra must be reported;

Some details of experimental methodologies of DSC, TGA, Raman and IR spectra were added in the experiment sections.

“and spectral range of 100-3500cm⁻¹”, “with spectral range of 600-4000cm⁻¹, test mode of transmission, liquid nitrogen retention time of 700mL/18h, slide of gold piece and sample thickness of 30-40μm.” “Thermo gravimetric (TG) and Differential Scanning Calorimetry (DSC) were recorded by the thermogravimetric/differential thermal analyzer (TG/DTA6200). The temperature ranged from room temperature to 500°C with heating rate of 10°C/min and the nitrogen was as protective gas.” were added in the experimental section.

4) On page 3, line 95, the AA state that ionogels are biocompatible, but this referee does not understand what is the experimental result supporting the above assertion;

To clearly describe, the sentence “Besides the biocompatibility and stretchability, the ionogles also processed excellent self-healing capability.” was deleted.

“Besides the flexibility and stretchability, the self-healing capability of the ionogels was also investigated.” was added.

5) The Aa must also explain how they assess the stretchability of the ionogel;

In this work, the stretchability of the ionogels was assessed by the (L-L₀)/L₀, where L₀ was the length of the ionogels without stretching and the L was the length after stretching.

“Herein, the stretchability of the ionogels was assessed by the (L-L₀)/L₀, where L₀ and L were the length of the ionogels without stretching and after stretching, respectively.” was added.

6) The manuscript must be carefully reread as it contains many typos and English mistakes.

The manuscript has been reread and corrected carefully.