

“Self-powered, Non-toxic, Recyclable Thermogalvanic Hydrogel Sensor
for Edibles Temperature Monitoring”

The authors greatly appreciate the editors and reviewers for the comments concerning our manuscript entitled “Self-powered, Non-toxic, Recyclable Thermogalvanic Hydrogel Sensor for Edibles Temperature Monitoring” (ID: 2466462). Those comments are all valuable and very helpful for revising and improving our paper, and provide important guidance to our researches. We have studied the comments carefully and made corresponding corrections. The revised texts in the manuscript are marked in red. The responses to the reviewers’ comments are as follows.

Point 1: The caption of Figure 3 seems a little chaotic. Some expressions are confused to readers. Please check and revise them.

Response 1: We sincerely thank the reviewer for the professional question. The caption in **Figure 3 (in Page 7)** of the manuscript has been modified so that the reader can more clearly understand the meaning of the test expressed in the figure, as follows :

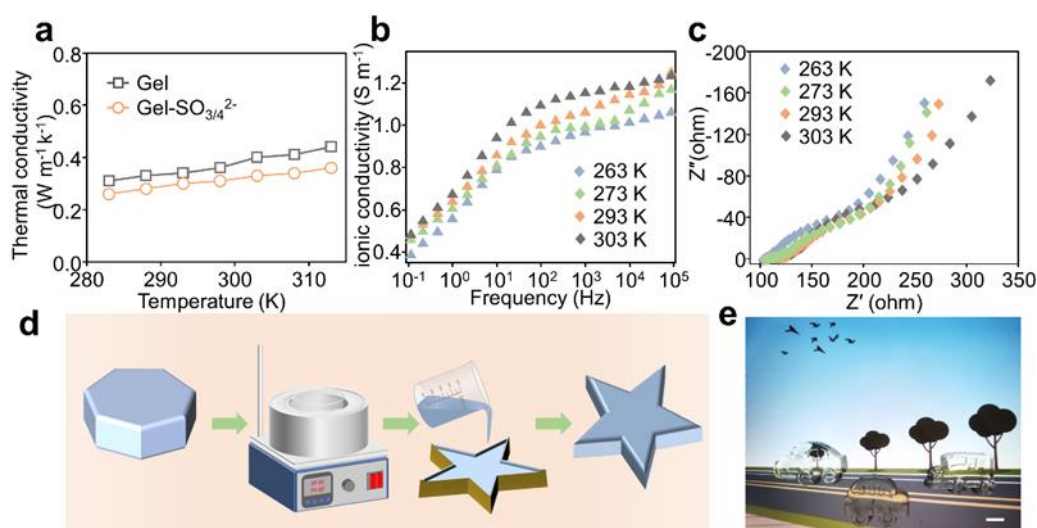


Figure 3. Thermal conductivity, electrical conductivity and recastability of Gel-SO_{3/4}²⁻ gel.. (a) Thermal conductivity of Gel-SO_{3/4}²⁻ gels with and without SO_{3/4}²⁻. (b) Frequency dependence of Gel-SO_{3/4}²⁻ gel conductivity at different temperatures. (c) EIS spectra with different temperature. (d) Gel-SO_{3/4}²⁻ gel remelt, recast schematic. (e) Physical photograph of Gel-SO_{3/4}²⁻ gel being recast in the shape of small cars.

Point 2: In the Introduction section, the authors stated that "The rise of the wearable electronics market has driven the demand for self-powered energy sources and generated interest in low-grade waste heat collection ". More references should be cited.

Response 2: Thanks very much for this detailed question. We have included the appropriate references in the introduction and have revised the **1st(line 15 to 24) paragraph** of the introduction

References:

Melzer, M.; Monch, J.I.; Makarov, D.; Zabala, Y.; Canon Bermudez, G.S.; Karnaushenko, D.; Baunack, S.; Bahr, F.; Yan, C.; Kaltenbrunner, M.; others. Wearable magnetic field sensors for flexible electronics. *Advanced Materials* 2015, 27, 1274 – 1280.

Mao, S.; Sun, B.; Zhou, G.; Guo, T.; Wang, J.; Zhao, Y. Applications of biomemristors in next generation wearable electronics. *Nanoscale Horizons* 2022, 7, 822 – 848.

Maita, F.; Piccialli, V.; Pensa, F.; Scatto, M.; Ruggeri, M.; Maiolo, L. Application of Unconditioned Nanostructured Thermoplastic-Based Strain Gauge Sensor inWearable Electronics. *IEEE Sensors Journal* 2022, 22, 24019 – 24026.

Point 3: Have the authors considered further packaging of the device to obtain long-term stability.

Response 3: We thank the reviewers for pointing out the key issues. For food temperature monitoring, we encapsulated the thermoelectric device with PU film, which not only enables direct contact when monitoring food temperature, but also improves long-term stability during gelation, the photos of the encapsulated thermoelectric parts, and the detection of water temperature are shown in Figure S8 and S9. **Details of the packaging can be seen in the line 281-284.**

Point 4: For food monitoring applications, why not do a monitoring comparison of several different foods?

Response 4: We sincerely thank the reviewer for the detailed and constructive suggestion. We added temperature monitoring for rice, apple, coffee, and ice cream, and made changes to the relevant parts of the manuscript from line 287 to line 305. Gel-SO3/42- gel for temperature detection of different foods are also added in **Figure S10 in Supporting Information.**

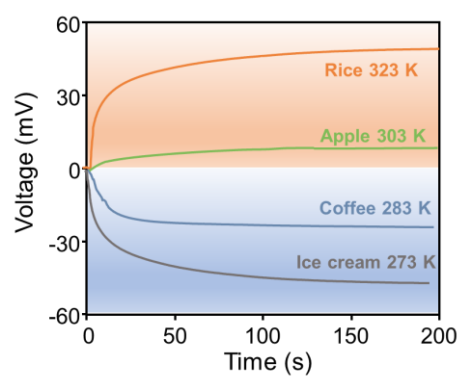


Figure S10. Gel-SO_{3/4}²⁻ gel for temperature detection of different foods.