Supplementary Information

Iontronic flexible pressure sensor based on multistage gradient micro-dome structure with broad sensing range for wearable devices

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Processing of AgNWs stock solutions

First, an appropriate amount of AgNWs suspension stock solution was taken and diluted in a solvent mixture of water and ethanol at a volume ratio of 1:1, and the volume ratio of the suspension to the solvent mixture was 1:10. Second, in order to make the adhesion between AgNWs and the substrate material stronger, Hydroxypropyl Methyl Mellulose (HPMC), which accounted for about 0.5% of the total mass, was also added to the dilution solution. Finally, the solution was heated in a water bath at 50 °C for 30 min. After obtaining the AgNWs solution, an appropriate amount was taken into a spray gun and repeatedly sprayed on the surface of the flexible substrate to obtain a flexible electrode, as shown in Fig. S1.

Supplementary Figures

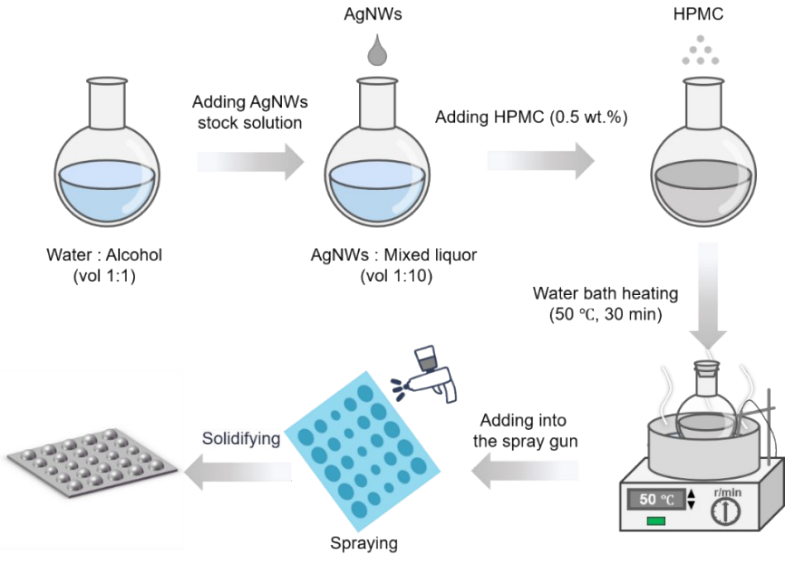

Fig. S1 Steps for the treatment of AgNWs stock solutions and the fabrication of AgNWs electrodes.

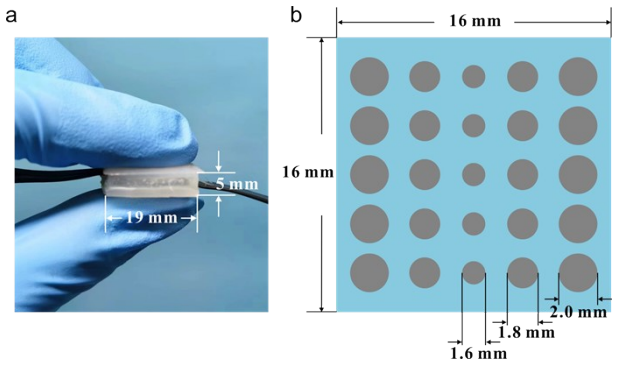

Fig. S2 (a) Dimension diagram of the packaged sensor. (b) Top view schematic of the structural electrode.

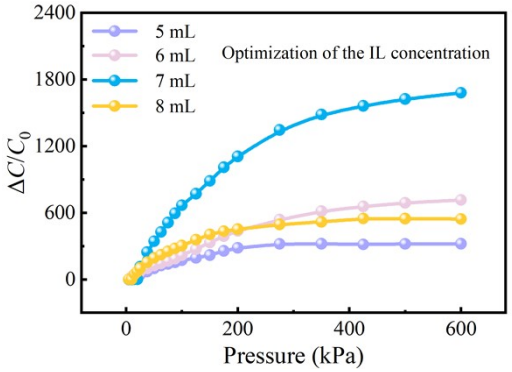

Fig. S3 Capacitance pressure profiles of the sensors under keeping the amount of PVA and deionized water constant at 2.2 g and 15.4 g, respectively, while varying the amount of IL (5 ml, 6 ml, 7 ml, 8 ml).

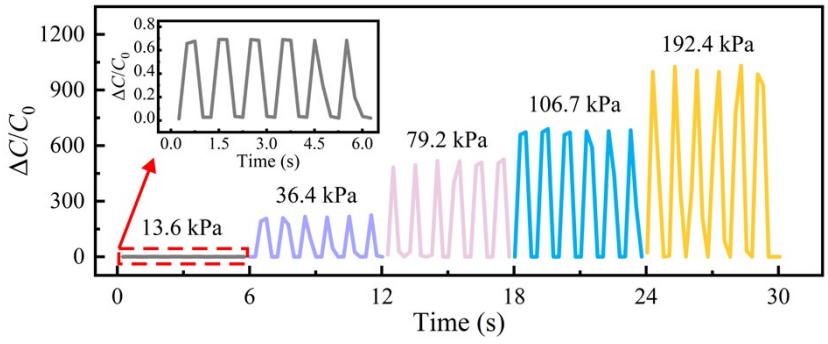

Fig. S4 The relative capacitive response of the sensor at different pressures.

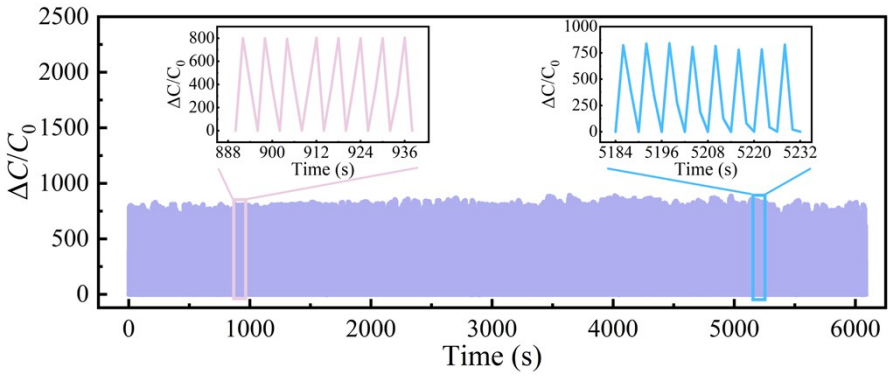

Fig. S5 The sensor was tested in 1000 compression-release cycles at a peak pressure of 136.8 kPa.

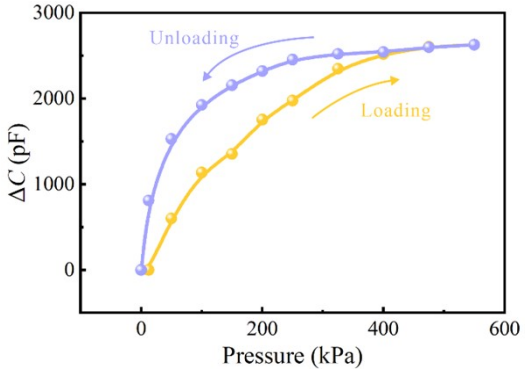

Fig. S6 The hysteresis characteristics of the sensor.

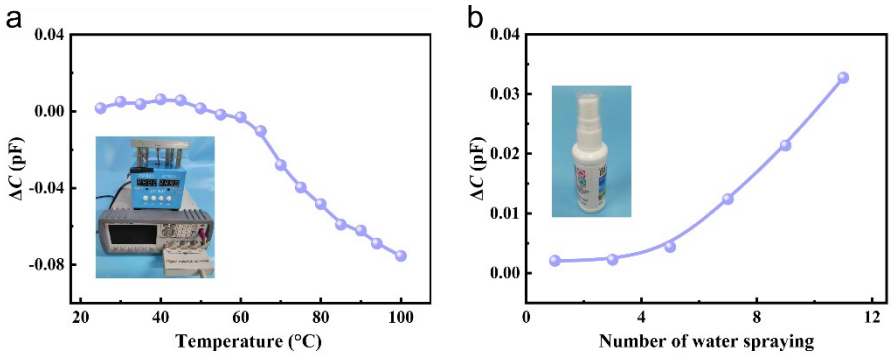

Fig. S7 (a) Plot of the capacitance change of the sensor when the ambient temperature is increased from room temperature (25 °C) to 100 °C. (b) Plot of the capacitance change of the sensor as the number of water sprays from the spray unit increases.

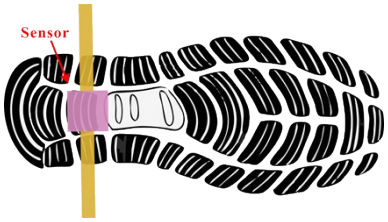

Fig. S8 Top view schematic of the sensor in the foot position.

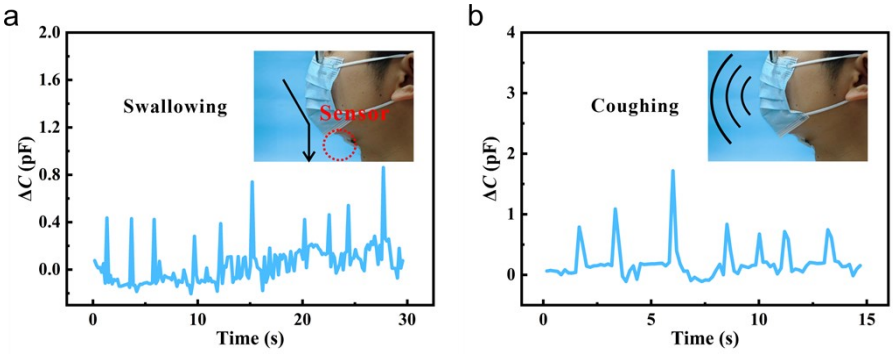

Fig. S9 Capacitance changes in swallowing (a), and coughing (b).

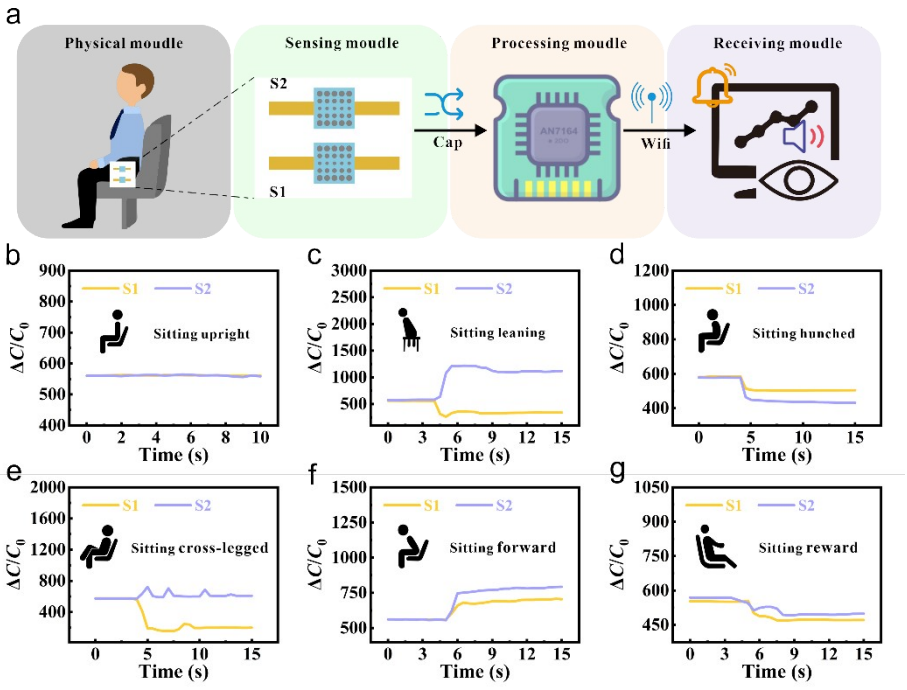

Fig. S10 The 1×2 sensor array enables the detection of different sitting postures. (a) Schematic diagram of sensor placement position. Capacitance changes in upright sitting (b), leaning sitting (c), hunched sitting (d), cross-legged sitting (e), forward sitting (f),

and reward sitting (g).

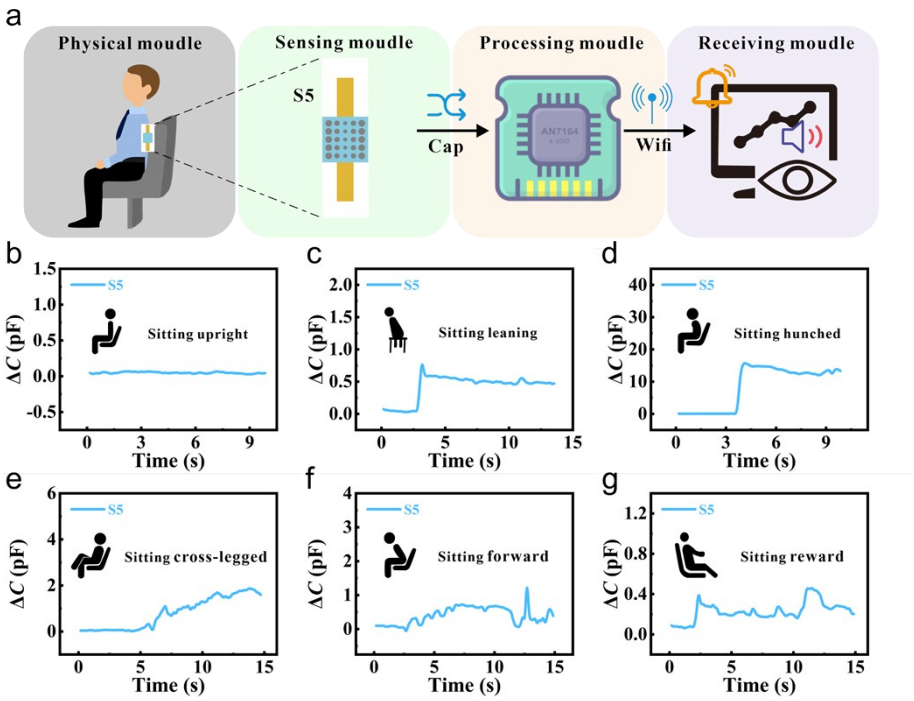

Fig. S11 The sensor at the spine detects different sitting postures. (a) Wireless sitting position detection system. Capacitance changes in upright sitting (b), leaning sitting (c), hunched sitting (d), cross-legged sitting (e), forward sitting (f), and reward sitting (g).