Hybrid electromechanical properties of hetero-doped and homogeneously bonded dual-mode pressure sensor for indoor body area network node

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Keywords dual-mode pressure sensor, homogeneous bonding, all-in-one structure, indoor body area network node, elderly caregiving microsystem

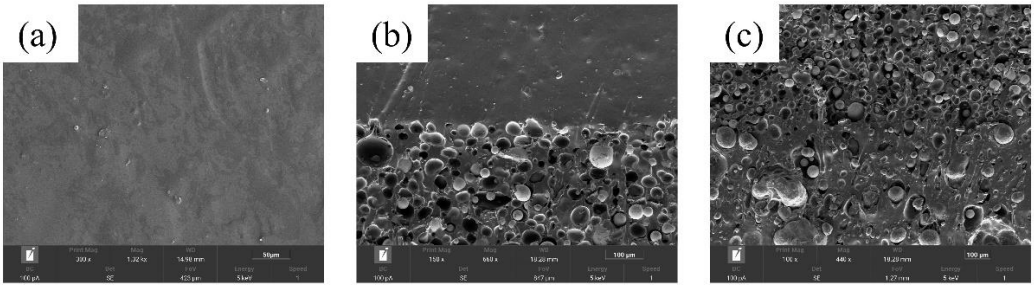

Figure S1 (a) The film without surface modification. (b) the interface view between triboelectric layer and electrode layer. (c) the interface view between electrode layer and piezoelectric layer.

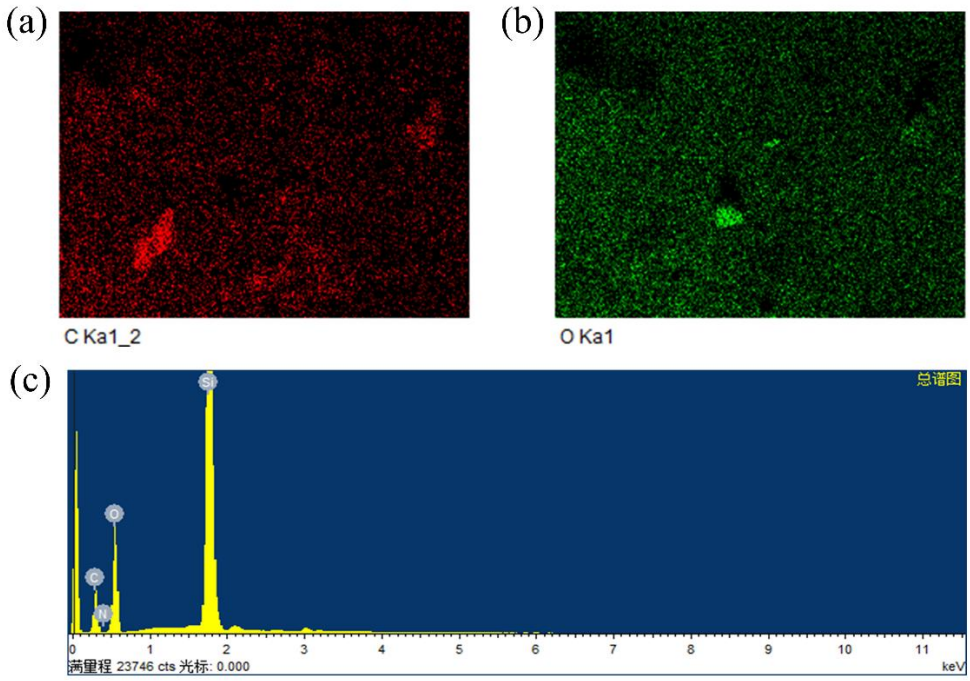

Figure S2 Energy dispersive spectroscopy (EDS) spectrum of the PAN-based composite film.

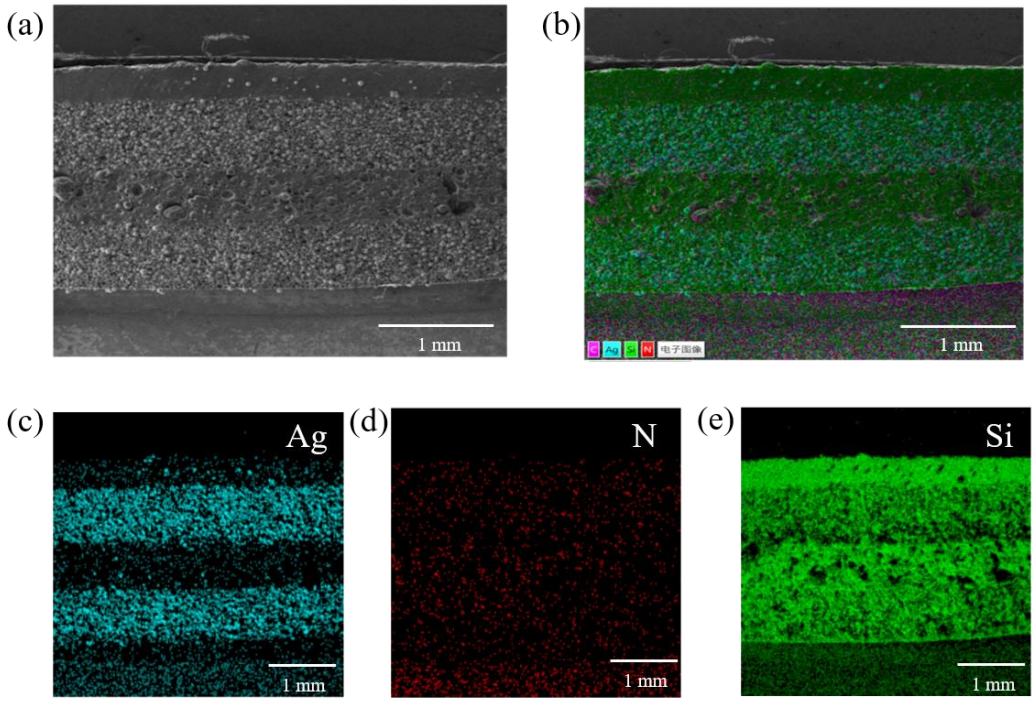

Figure S3 (a) The SEM images of the tested location; (b-e) The EDS images of four elements, Ag, N and Si, respectively.

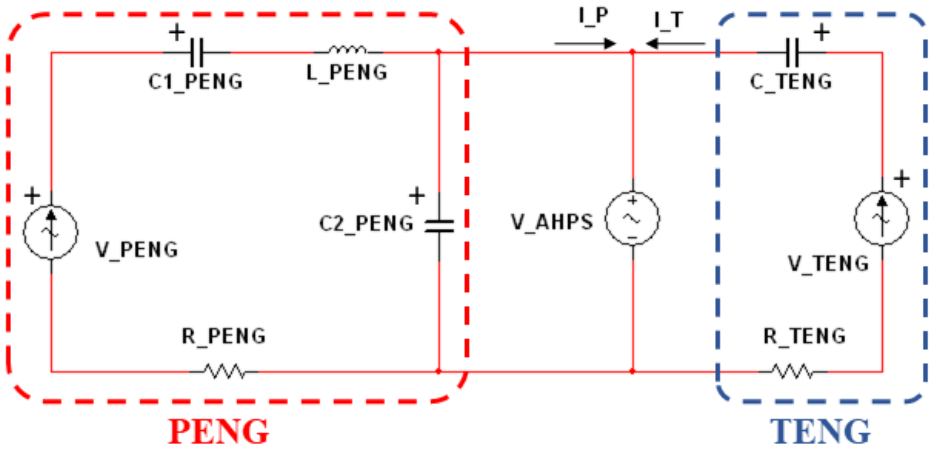

Figure S4 Equivalent circuit model of the hybrid sensor.

Detailed representations of notations for output performance of triboelectric part of ACPS

In Formula (1) and (2), Q represents the transfer charges between up electrode and active layer, S and $x(t)$ represent the surface contact area and distance between the triboelectric layer and the active layer, respectively. The thickness layer and the surface charge density of the triboelectric are expressed as d_0 and σ, respectively. And ε_0 means the dielectric constant of air. In addition, Q_{sc} represent short-circuit transfer charge.

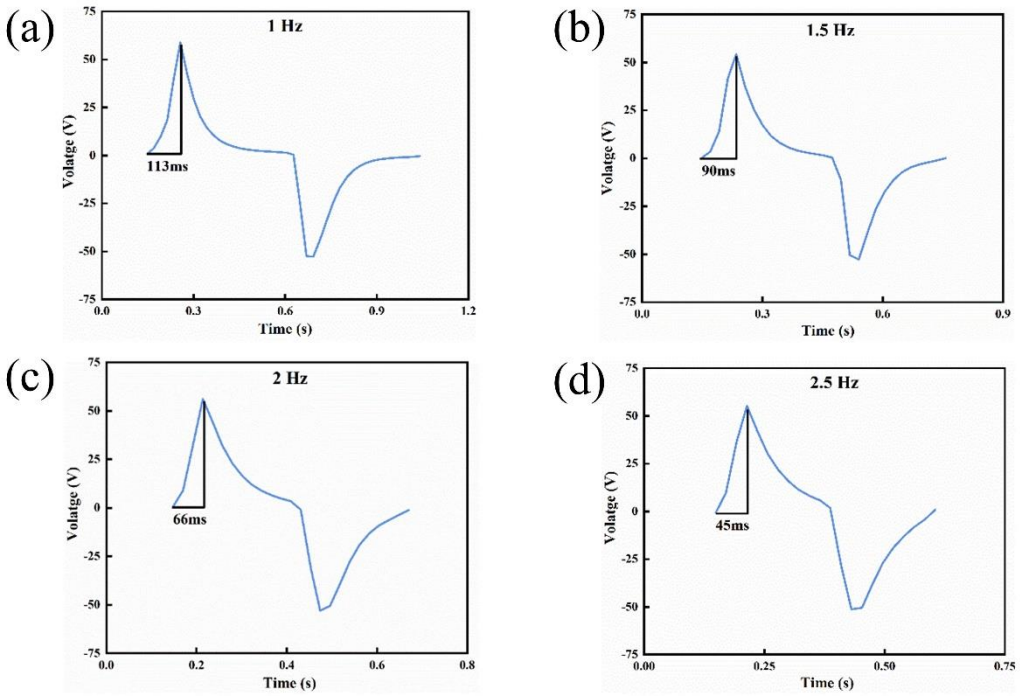

Figure S5 The response time of the ACPS under an applied pressure of 20 N at different frequencies (1 Hz, 1.5 Hz, 2 Hz, 2.5 Hz).

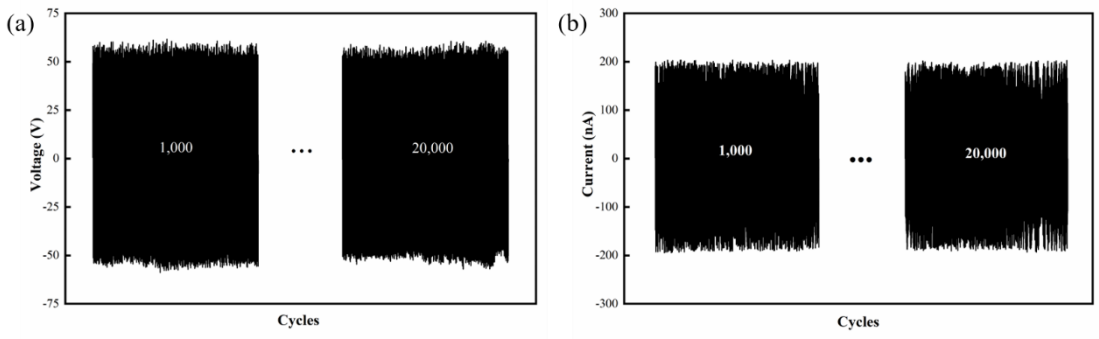

Figure S6 Output voltage/current stability test of the ACPS.

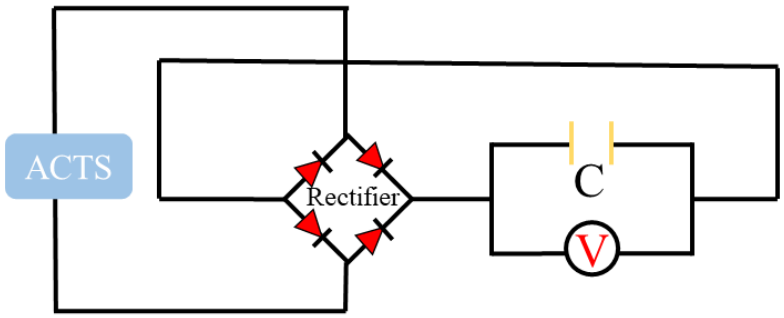

Figure S7 The circuit connection diagram of capacitor charging curves.

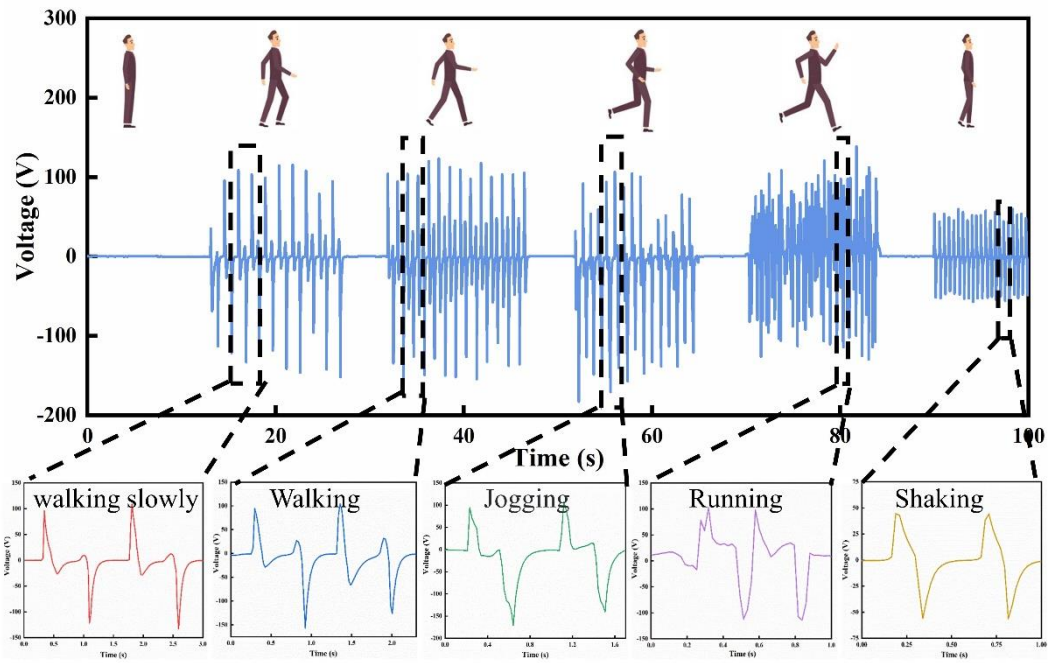

Figure S8 The output of the ACPS during the whole gait movement process.