

Supplementary Information

Tactile/thermal dual-modal perceptual platform by integrating thermoelectric generator and triboelectric nanogenerator with oxide neuromorphic transistor

Xin Huang ^a, Si Yuan Zhou ^a, Wei Sheng Wang ^a, You Jie Huang ^a, Bei Chen Gong ^a,
Jia Kang Di ^a, Xiao Hui ^b, Li Qiang Zhu ^{a,*}

^a School of Physical Science and Technology, Ningbo University, Ningbo 315211,
Zhejiang, People's Republic of China

^b Ningbo Institute of Material Technology and Engineering, Chinese Academy of
Sciences, Ningbo, 315201, P.R.China

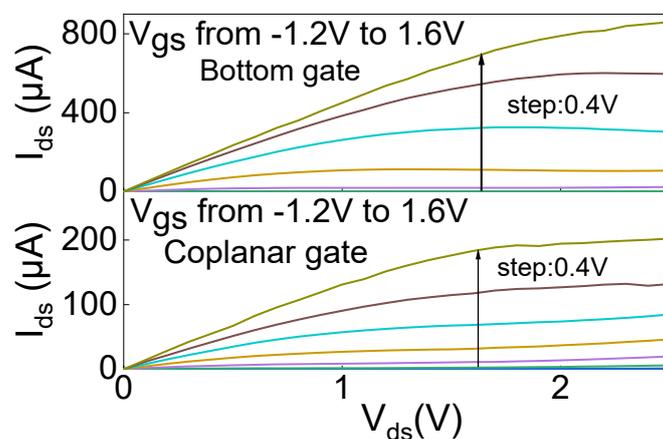


Figure S1 Output characteristics of the ITO neuromorphic transistors at bottom gate (G_B) and co-planar gate (G_C) mode.

* E-mail: zhuliqiang@nbu.edu.cn (Li Qiang Zhu)

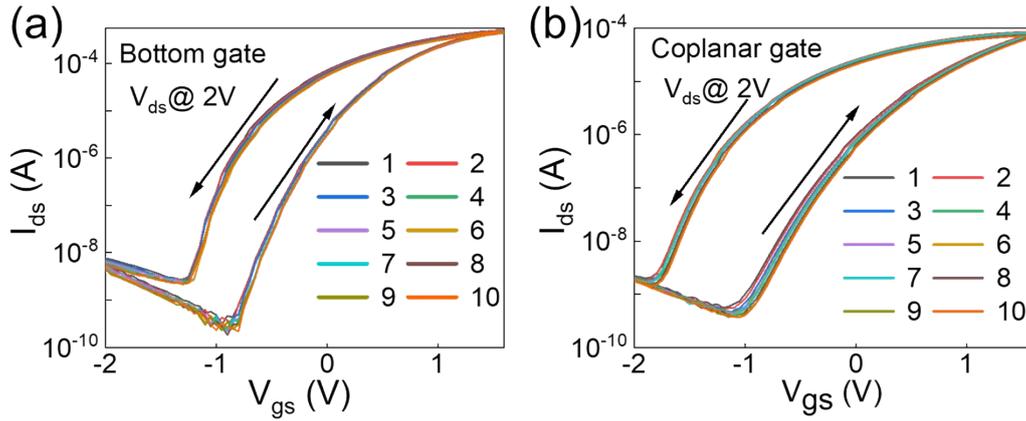


Figure S2 Ten transfer curves of the ITO neuromorphic transistors at (a) bottom gate (G_B) and (b) co-planar gate (G_C) mode.

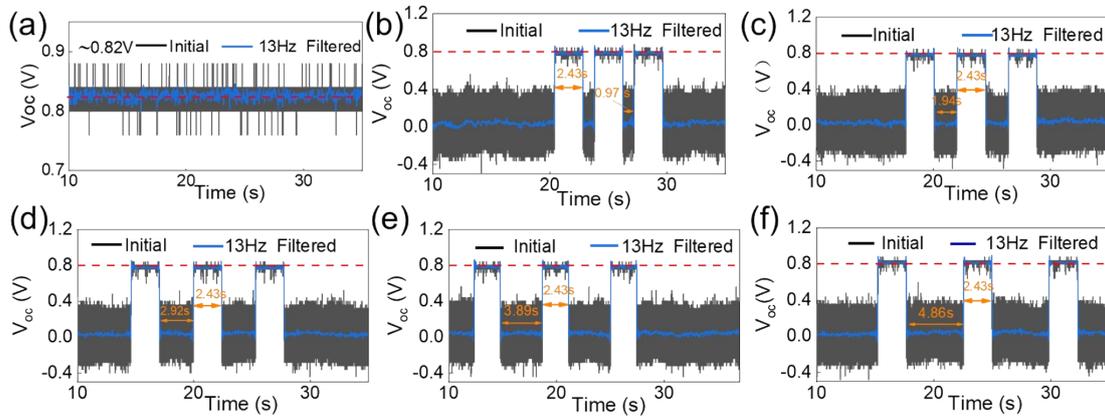


Figure S3. (a) V_{oc} output from TEG without photoelectric control. Square wave signal with duration of 2.43s generated by the TEG with photoelectric control at different interval time of: (b) 0.97 s, (c) 1.94 s, (d) 2.92 s, (e) 3.89 s and (f) 4.86s.

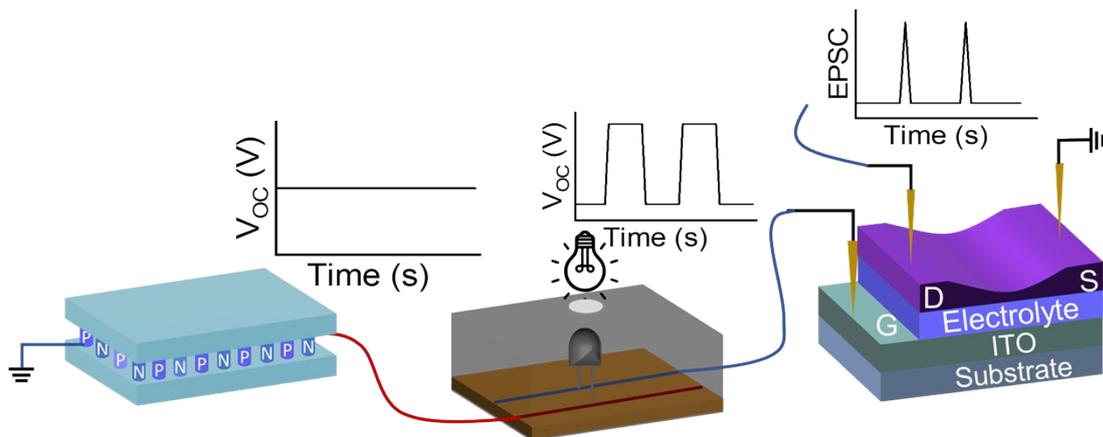


Figure S4 Schematic diagram of the bionic thermal perceptual system (TPS) by connecting ITO neuromorphic transistor with TEG.

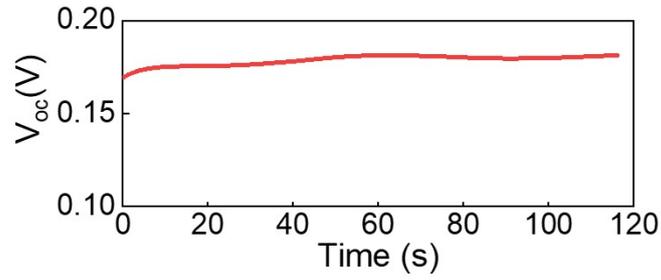


Figure S5 V_{oc} of TEG at ΔT of 5.6°C.

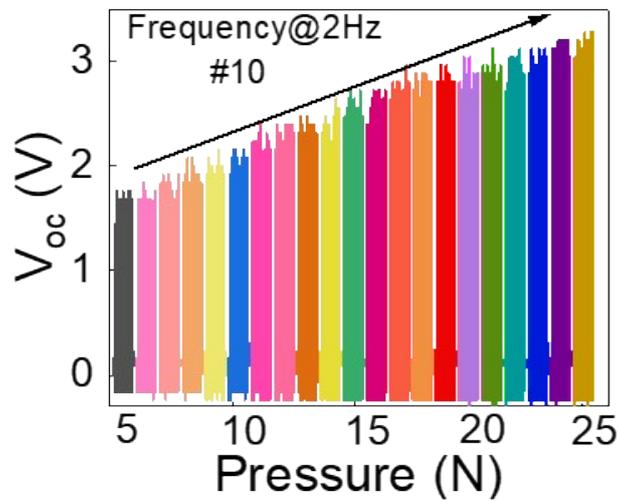


Figure S6. Dynamic unipolar V_{oc} of the TENG on pressures ranging from 5 N to 25 N at a frequency of 2 Hz.

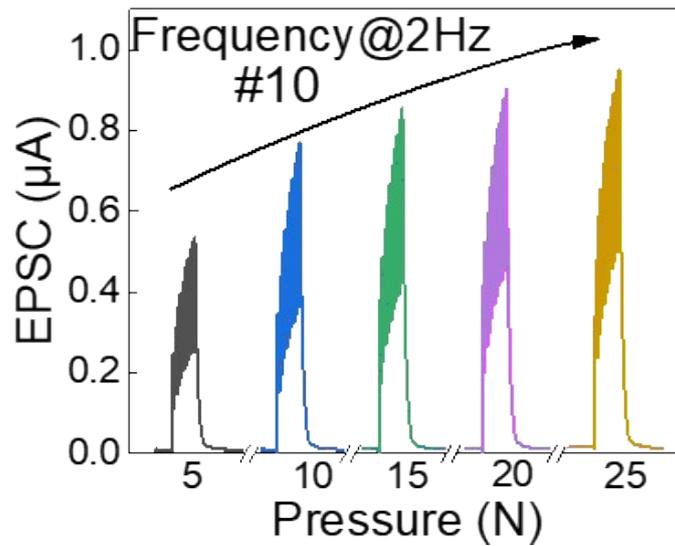


Figure S7. Multiple EPSC responses generated on the neuromorphic transistor when ten pressures are continuously applied to the TENG at a frequency of 2 Hz.