Supporting information for

**Self-powered bifunctional sensor Based on Tribotronic Planar Graphene Transistors**

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**Supplementary Text**

**Fig. SI.1**. Raman spectrum of the pristine graphene by CVD grown monolayer.

**Fig. SI.2**. The real-time triboelectrical tests of tribotronic GFETs. (*V*DS=0.5V, distance=1mm).

**Fig. SI.3.** Left panel: The extracted curves of post-synaptic current (EPSC)-triboelectric distance with tribopotential as pre-synaptic stimuli. Right panel: The extracted curves of post-synaptic current (EPSC)- triboelectric distance with tribopotential as pre-synaptic stimuli.

**Fig. SI.4** Left panel: EPSC of GFET under varied frequency of triboelectric pulse. Right panel: Extracted AN/A1Variation frequency of triboelectric pulse (N=1-10, 1Hz-10Hz) of EPSC(triboelectric distance=200μm,spike time interval Δtpre=ms, spike tension time =10ms)

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**Supplementary Figures**

**Fig. SI.1.**Raman spectrum of the pristine graphene by CVD.

**Fig. S2.**The real-time triboelectrical tests of tribotronic GFETs (*V*DS=0.5V, distance=1mm).

**Fig. S3** Left panel: The extracted curves of post-synaptic current (EPSC)-triboelectric distance with tribopotential as pre-synaptic stimuli. Right panel: The extracted curves of post-synaptic current (EPSC)- triboelectric distance with tribopotential as pre-synaptic stimuli.



**Fig. S4** (a) EPSC of GFET under varied frequency of triboelectric pulse

(b) PPF of the second pulse of 10 pulses. (c)Extracted AN/A1 of 5Hz spike pulse of EPSC(triboelectric distance=200μm,spike time interval Δtpre=ms, spike tension time =10ms).