

Supporting Information

Newton's Cradle Motion-like Triboelectric Nanogenerator to Enhance Energy Recycle Efficiency by Utilizing Elastic Deformation

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Figure S1. Schematic diagram of the experiment setup and measurement system for testing the performance of the NC-TENG.

Figure S2. Triboelectrification procedure of the NC-TENG. The purple arrows stands for the velocity direction of motion module of linear motor.

Figure S3. (a) The simplified model of the NC-TENG. (b1-b3) The working mechanism of capacity-like triboelectric nanogenerator in approximate conditions.

Figure S4. Structure diagrams of (a) the simple contact-separation structure TENG, (b) the NC-TENG with spring laminations cut and (c) the NC-TENG. (a1-c1) Corresponding digital photograph of three TENGs. (a2-c2) Corresponding output voltage of three TENGs under different working amplitudes.

Figure S5. (a) The output current, (b) output voltage and (c) output power of three different TENGs with similar structure under different external resistances.

Figure S6. The output voltage of the NC-TENG under different displacement amplitudes at different periods of (a) 700 ms, (b) 600 ms, (c) 500 ms.

Figure S7. The mechanism of subsequent vibration. (a-c) Schematic diagrams of the one side charge distributions and current direction. (d)(e) Current-time plot corresponding to the a-c

process.

Figure S8. The digital photograph of the self-powered flashing clapping palm.

Video 1. For a common TENG, the Al electrode on an acryl plate moves between two PTFE films fixed on opposite acryl plates to contact/separate the PTFE films alternately driven by linear motor.

Video 2. For a NC-TENG with the steel plate cut to eliminate the elasticity, the periodic contact/separation between the PTFE plates and Al electrode is driven by linear motor.

Video 3. For the NC-TENG, the periodic contact/separation between the PTFE plates and Al electrode is driven by linear motor.

Video 4. The self-powered flashing clapping palm is driven by a hand.

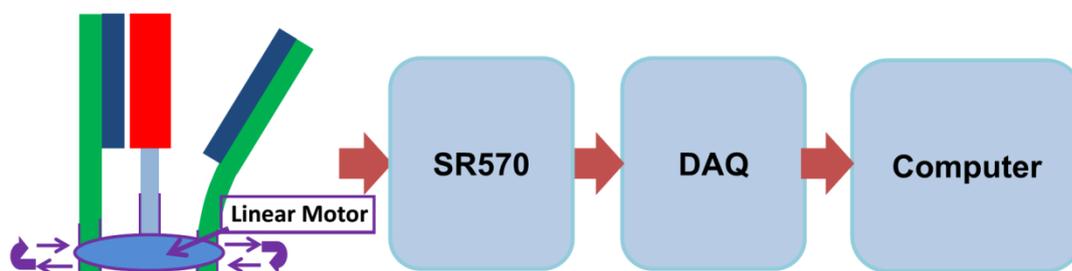


Fig. S1 Schematic diagram of the experiment setup and measurement system for testing the performance of the NC-TENG.

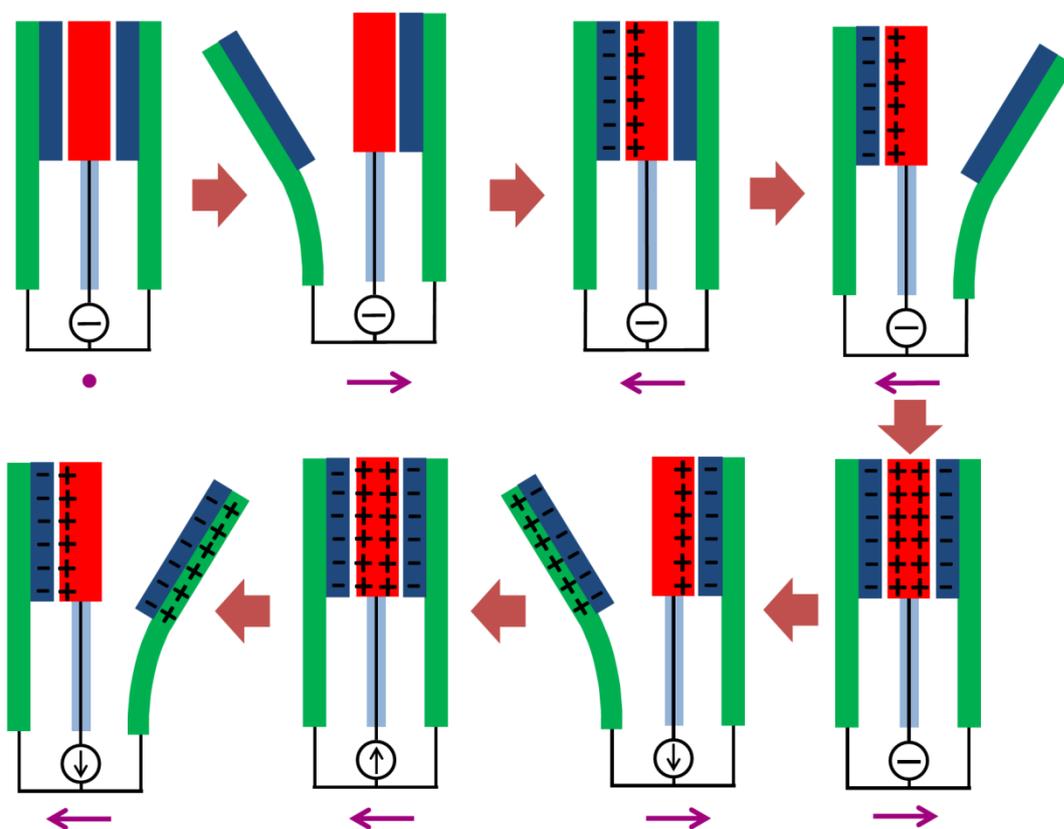


Fig. S2 Triboelectrification procedure of the NC-TENG. The purple arrows stands for the velocity direction of motion module of linear motor.

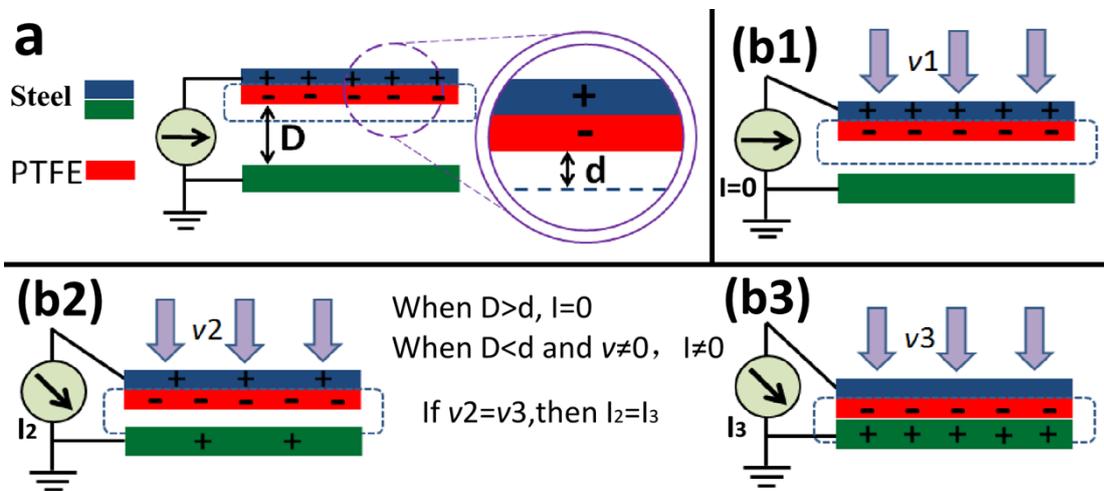


Fig. S3 (a) The simplified model of the NC-TENG. (b1-b3) The working mechanism of capacity-like triboelectric nanogenerator in approximate conditions.

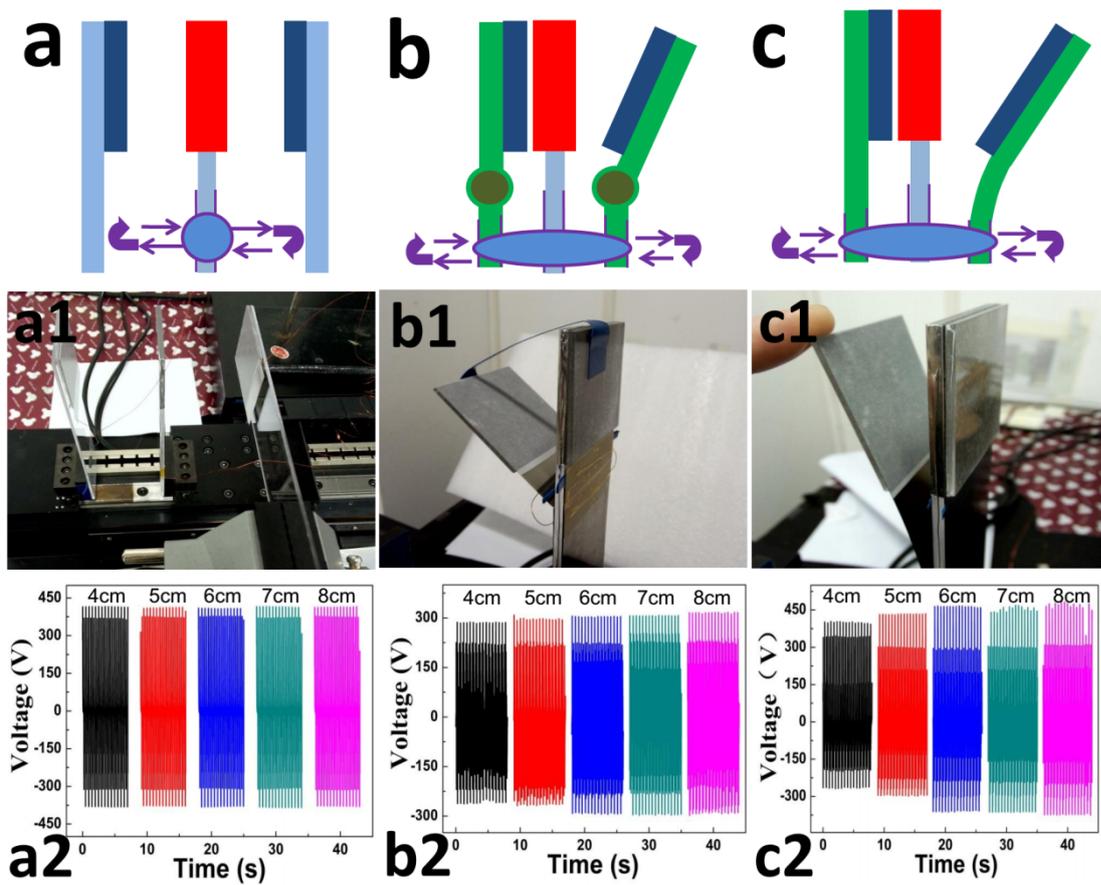


Fig. S4 Structure diagrams of (a) the simple contact-separation structure TENG, (b) the NC-TENG with spring laminations cut and (c) the NC-TENG. (a1-c1) Corresponding digital photograph of three TENGs. (a2-c2) Corresponding output voltage of three TENGs under different working amplitudes.

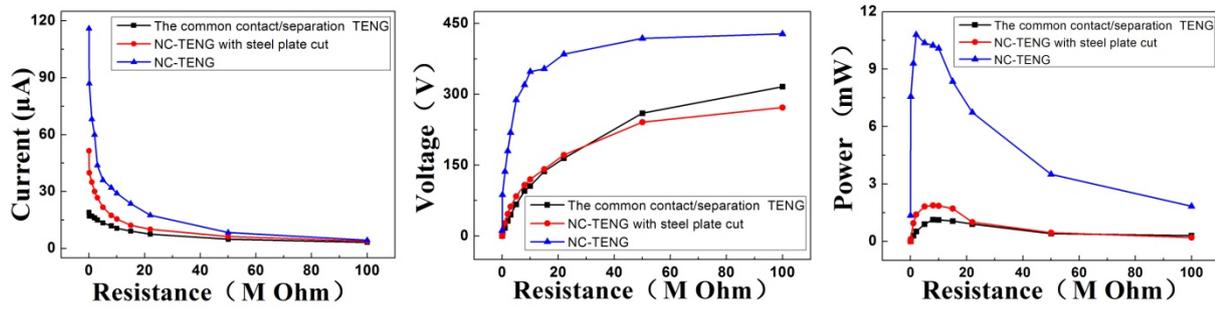


Fig. S5 (a) The output current, (b) output voltage and (c) output power of three different TENGs with similar structure under different external resistances.

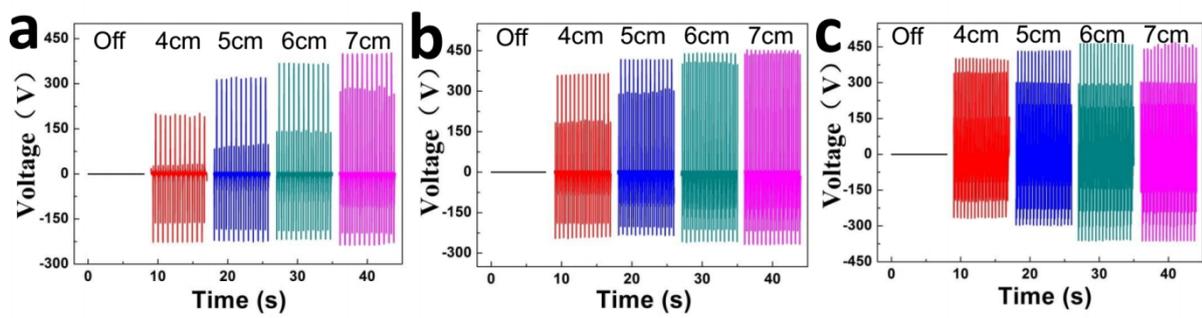


Fig. S6 The output voltage of the NC-TENG under different displacement amplitudes at different periods of (a) 700 ms, (b) 600 ms, (c) 500 ms.

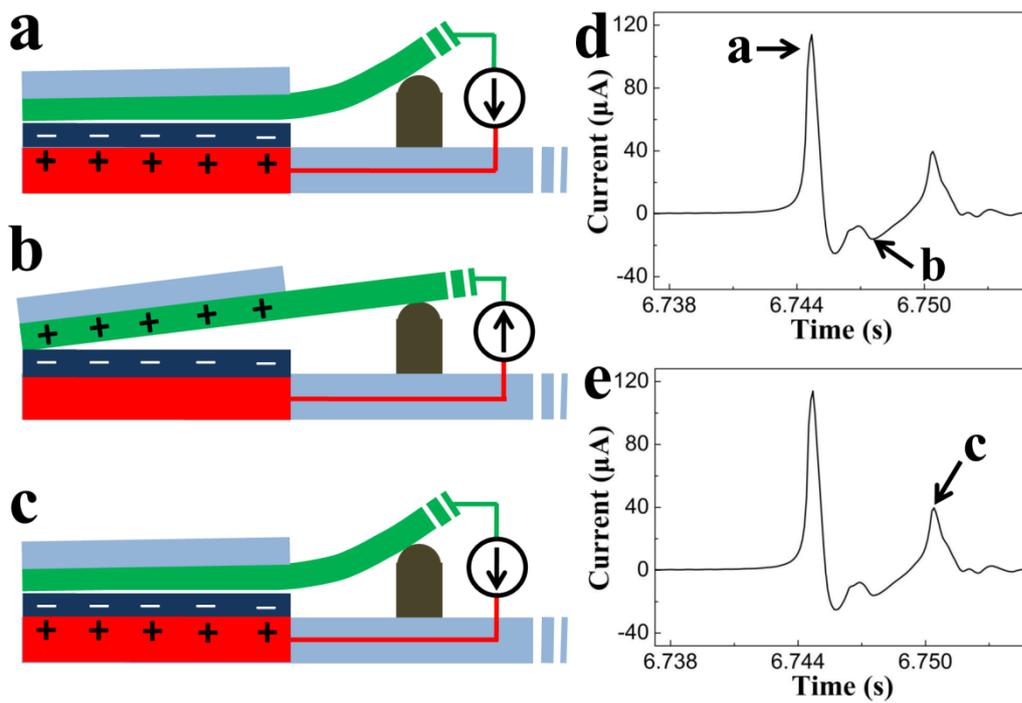


Fig. S7 The mechanism of subsequent vibration. (a-c) Schematic diagrams of the one side charge distributions and current direction. (d)(e) Current-time plot corresponding to the a-c process.

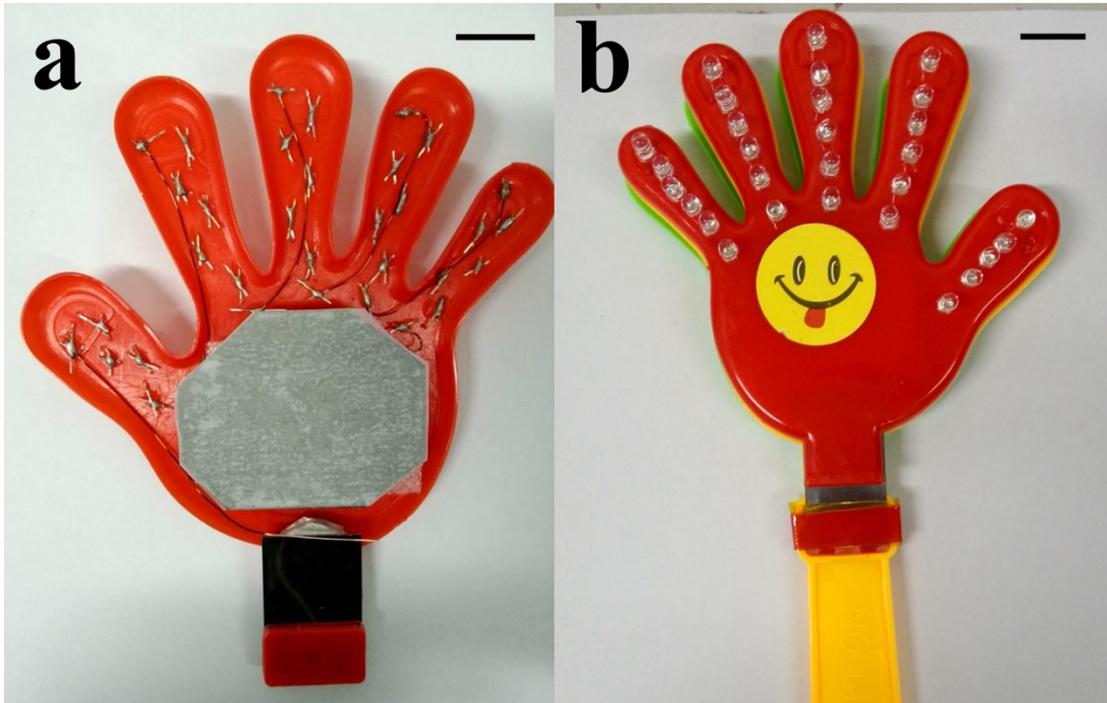


Fig. S8 The digital photograph of self-powered flashing clapping palm. The scale bars are all 2 cm.