Supplementary information

Fractal structure charge-excitation triboelectric nanogenerator for powering portable electronics

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Supplementary figures

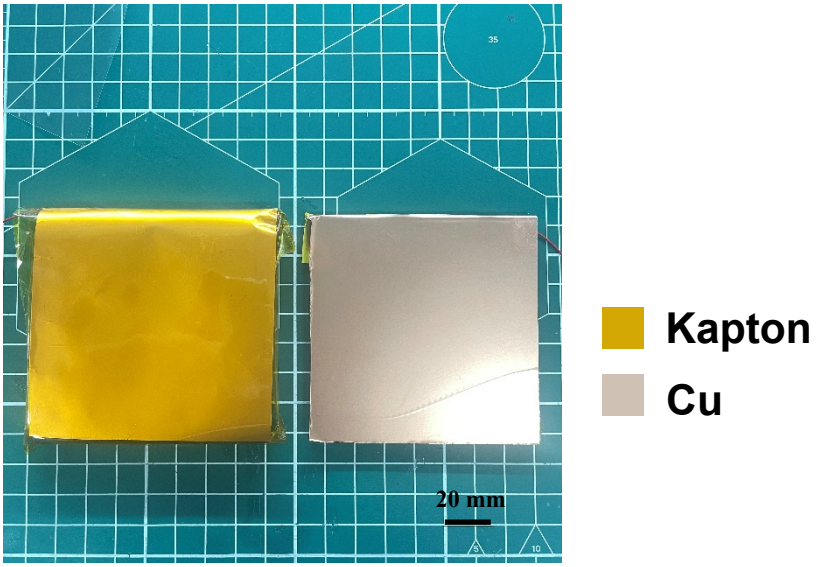

Fig. S1 Photograph of the fabricated FSC-TENG device with the size of 100 mm × 100 mm.

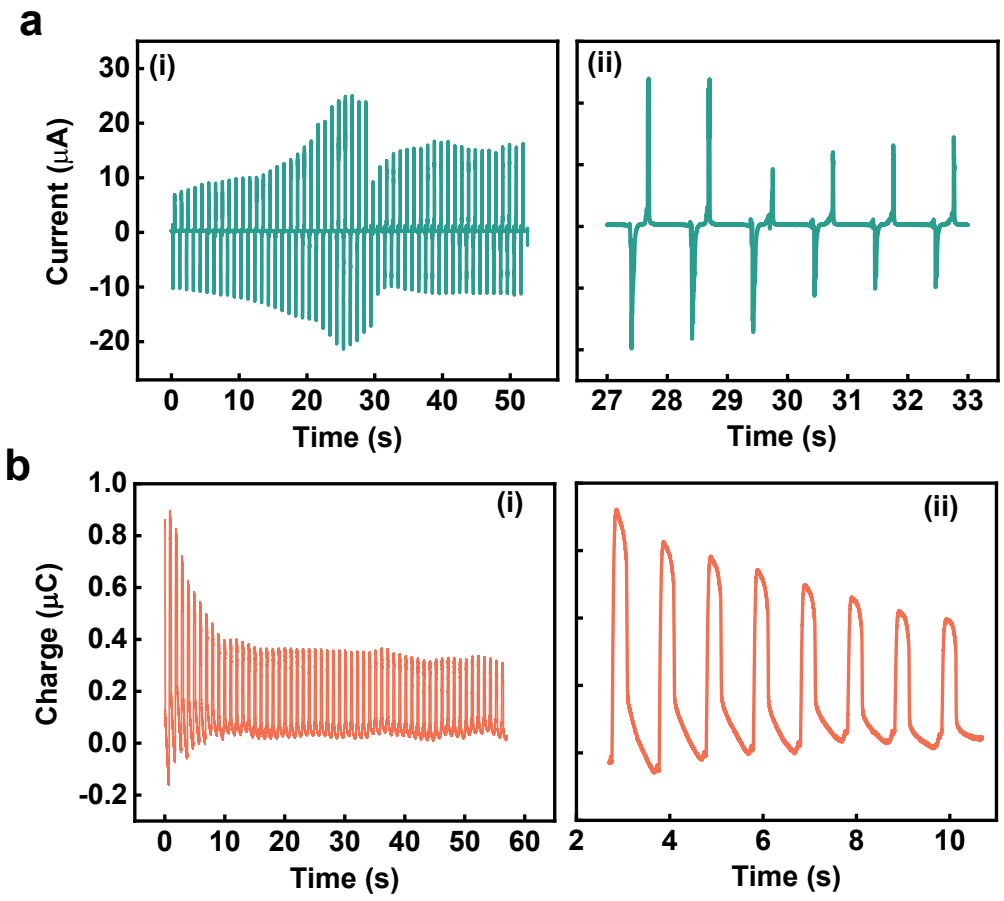

Fig. S2 a) Short-circuit current, and b) transferred charge of the FSC-TENG without the regulator diodes.

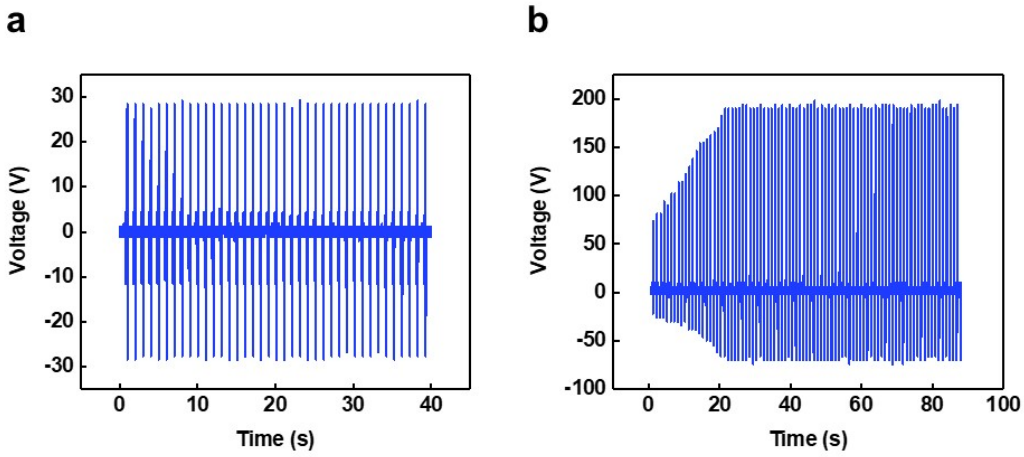

Fig. S3 a) Output voltage of the TENG without charge excitation. b) Output voltage of the TENG with charge excitation.

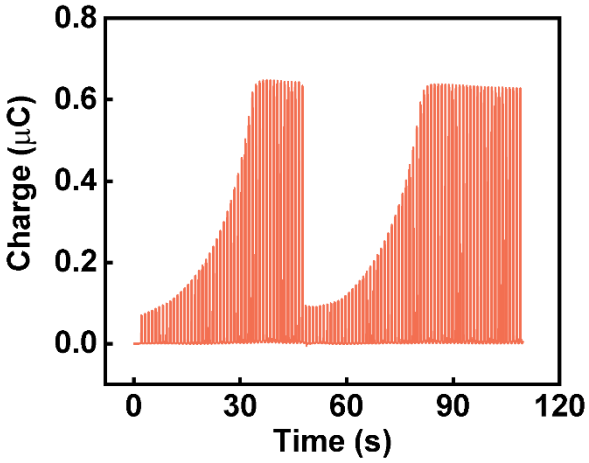

Fig. S4 Transferred charge profile of the FSC-TENG retested after the discharging process at the frequency of 1 Hz when the linear motor continuously works.

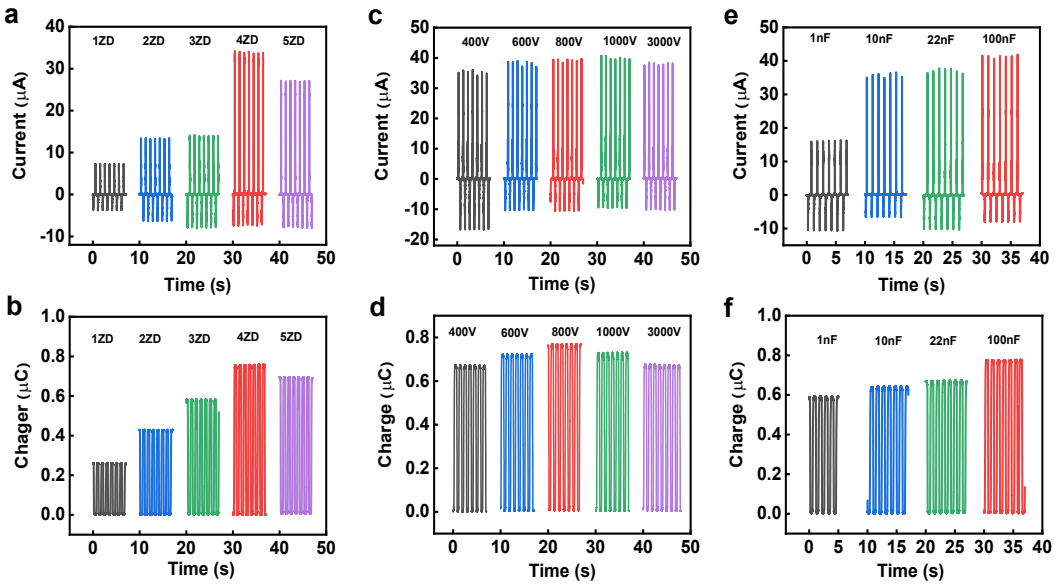

Fig. S5 a-b) Effect of the diode withstand voltage diodes on the (a) short-circuit current, (b) transferred charge of the FSC-TENG devices. c-d) Effect of the capacitances of ceramic capacitors in the FSCC on the (c) short-circuit current, (d) transferred charge of the FSC-TENGs. e) Short-circuit current, f) transferred charge of the FSC-TENG devices for different numbers of regulator diodes.

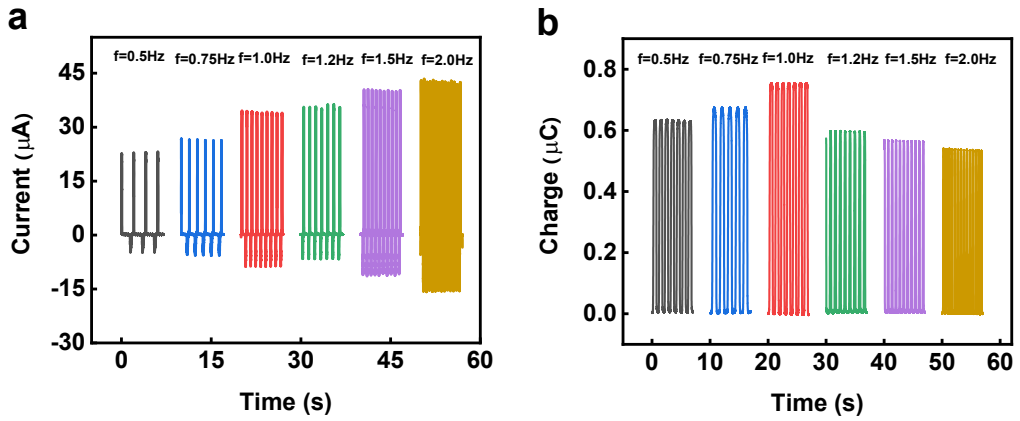

Fig. S6 a) Short-circuit current, and b) transferred charge of the FSC-TENG obtained at different operating frequencies.

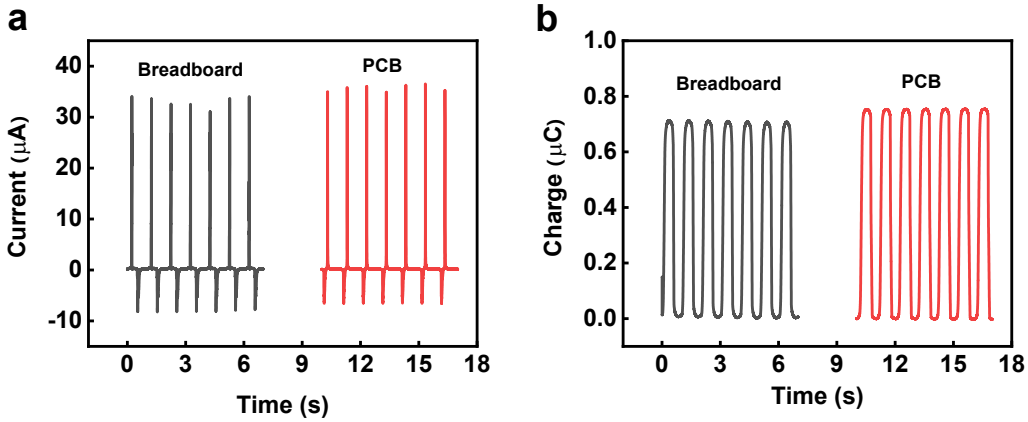

Fig. S7 Comparison of the a) short-circuit current, and b) transferred charge of the FSC-TENG at 1 Hz when the electronic components are integrated on the breadboard and PCB.

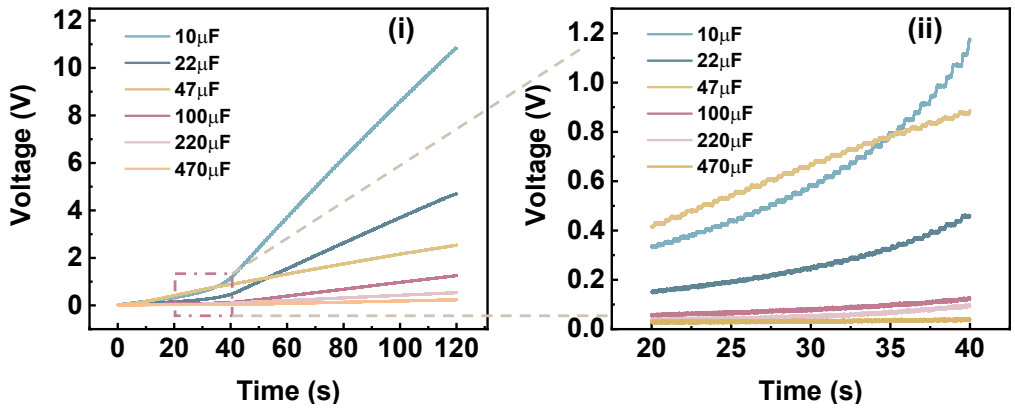

Fig. S8 Charging voltage profiles for different capacitors at the unsaturated state, and enlarged view of the charging profiles during the charge excitation process.

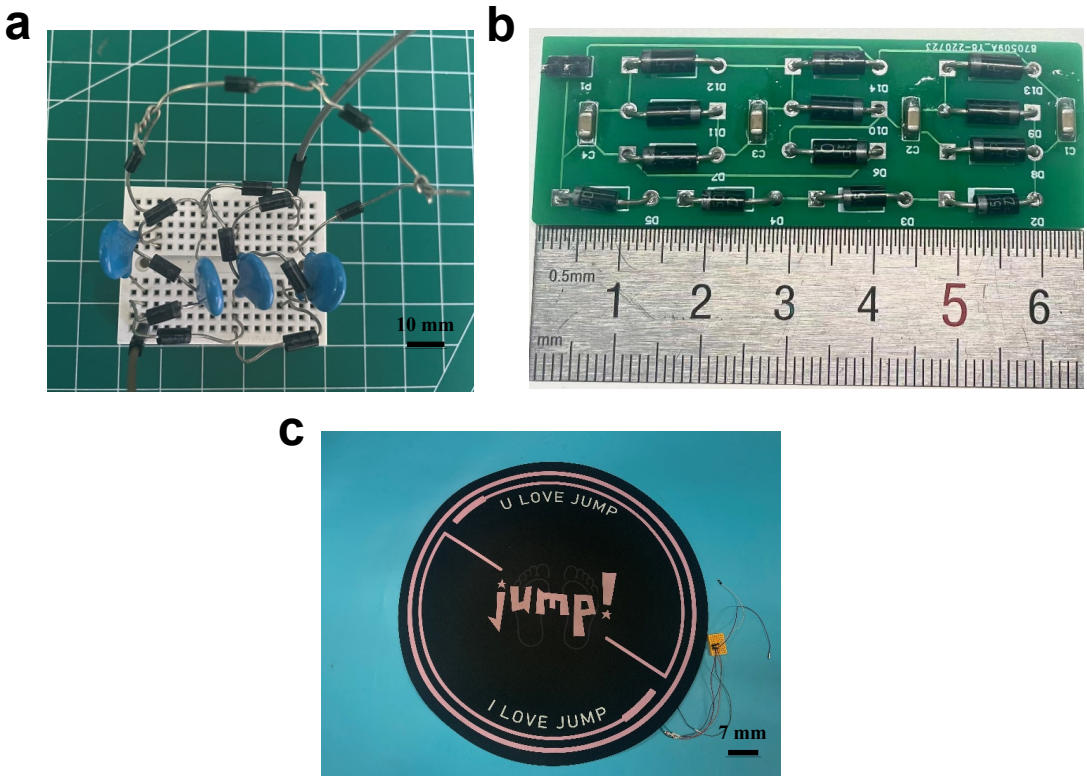

Fig. S9 Photographs of the FSCC of 4 = 2 × 2 structure when these components are integrated on a) the breadboard and b) the PCB. c) Photograph of the yoga mat integrated with the FSC-TENG.

Supplementary Tables

Table S1. Parameters of the electronic components used in the FSCC.

Diode

Model	Parameter	Reverse leakage current
1N4004	1 A/400 V	5 μA
1N4005	1 A/600 V	5 μA
BYV26D	1 A/800 V	5 μA
1N4007	1 A/1000 V	5 μA
R3000	0.2 A/3000 V	5 μA

Ceramic capacitor

Model	Withstand voltage
102	2000 V
103	2000 V
223	2000 V
104	1000 V

Video S1. Recharging process of the FSC-TENG after the discharging process at the frequency of 2 Hz.

Video S2. Charging and discharging process of the capacitor by the FSC-TENG to power the hygrothermograph.

Video S3. Charging and discharging process of the capacitor by the FSC-TENG integrated with the yoga mat to power the electronic watch.

Video S4. Charging and discharging process of the capacitor by the FSC-TENG integrated with the yoga mat to power the pedometer.