Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

LEGO-block-inspired versatile triboelectric nanogenerator as power cells to harvest vibration energy

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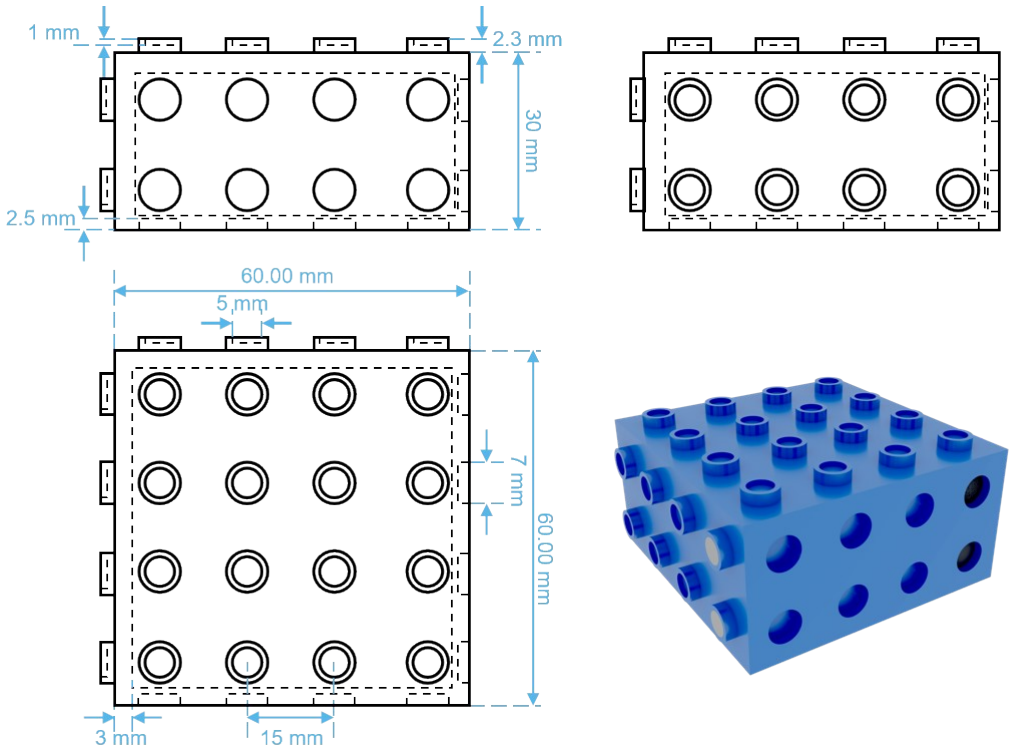

Fig. S1 Shell size of LI-TENG.

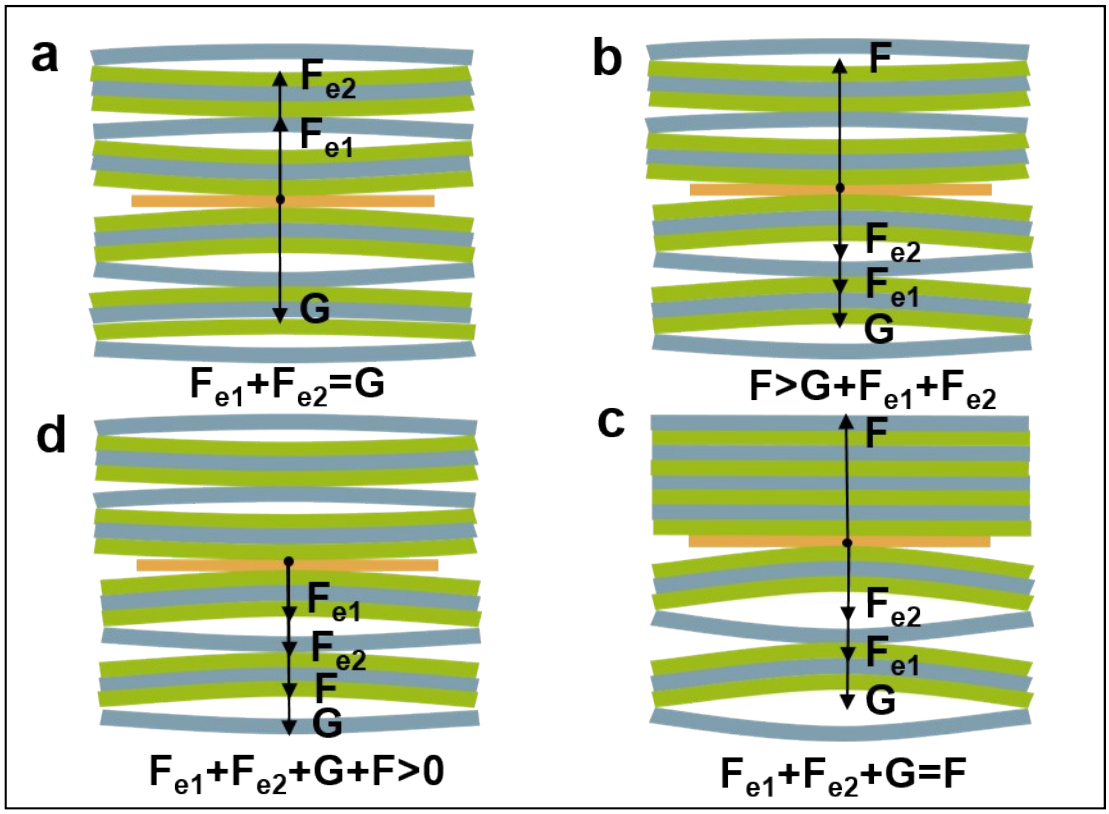

Fig. S2 The force analysis diagram for four different states.

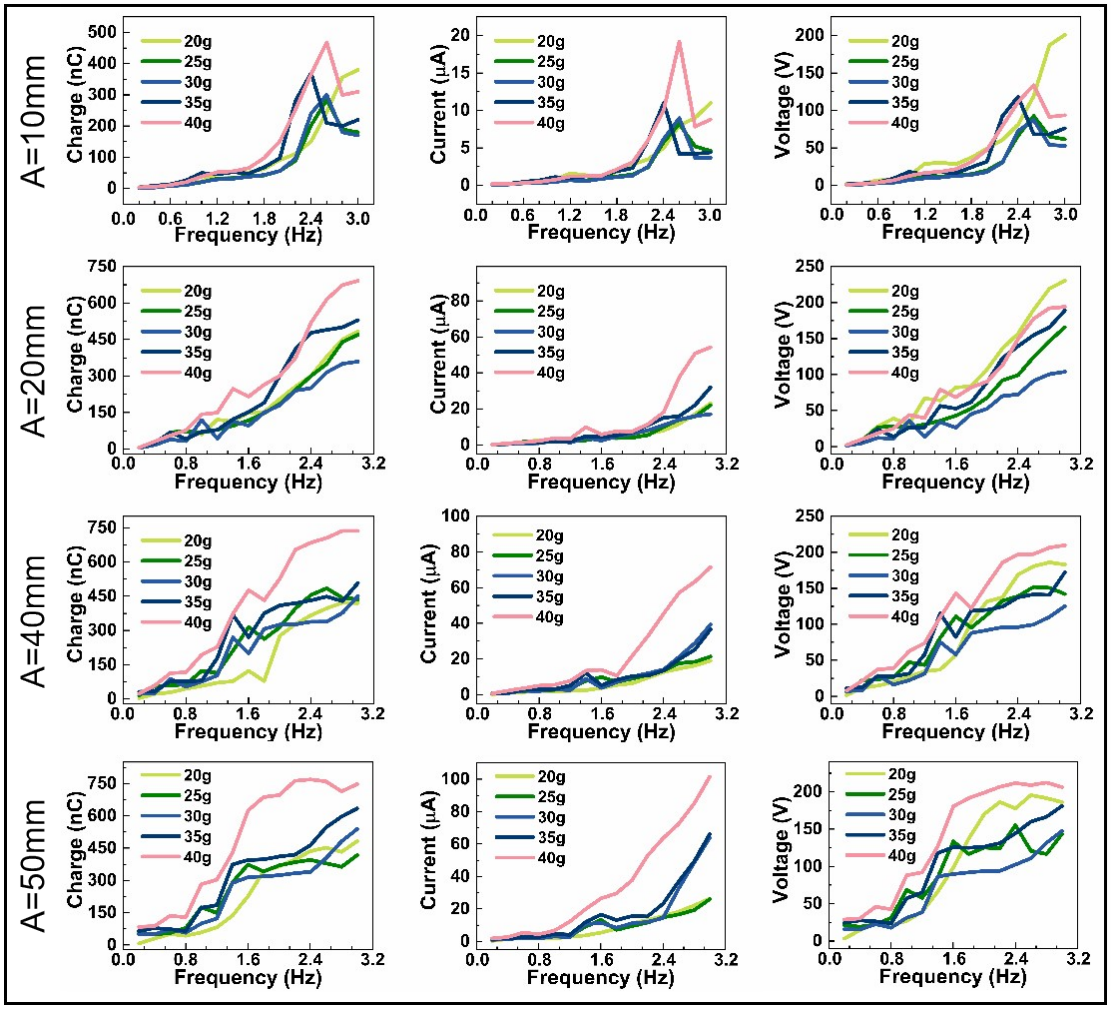

Fig. S3 Short-circuit charge transfer, short-circuit current and open-circuit voltage for five LI-TENGs with different copper block masses at fixed amplitudes and different frequencies of the horizontal reciprocating motion of the linear motor.

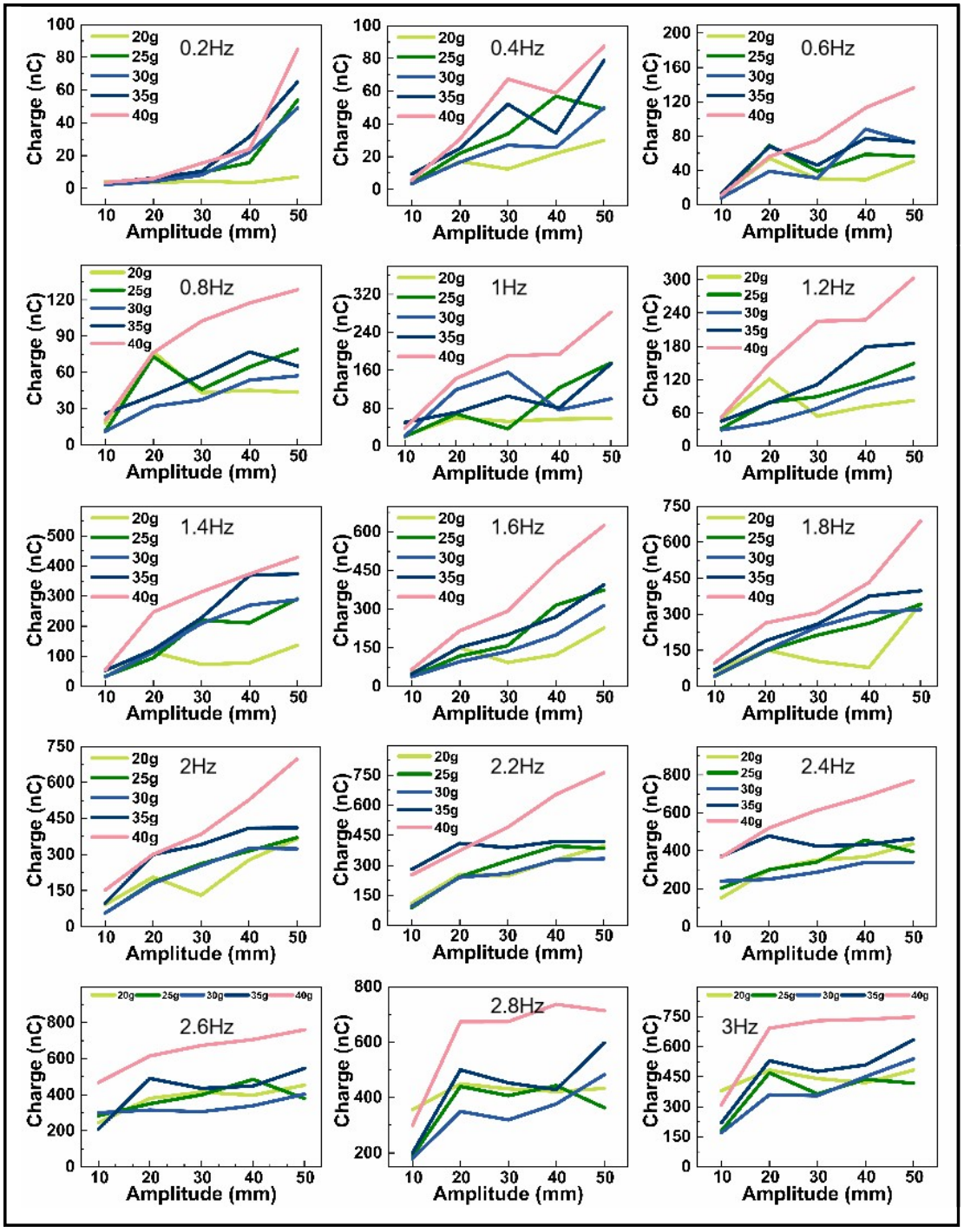

Fig. S4 Short-circuit charge transfer for five LI-TENGs with different copper masses at fixed frequencies and different amplitudes in the horizontal reciprocating motion of a linear motor.

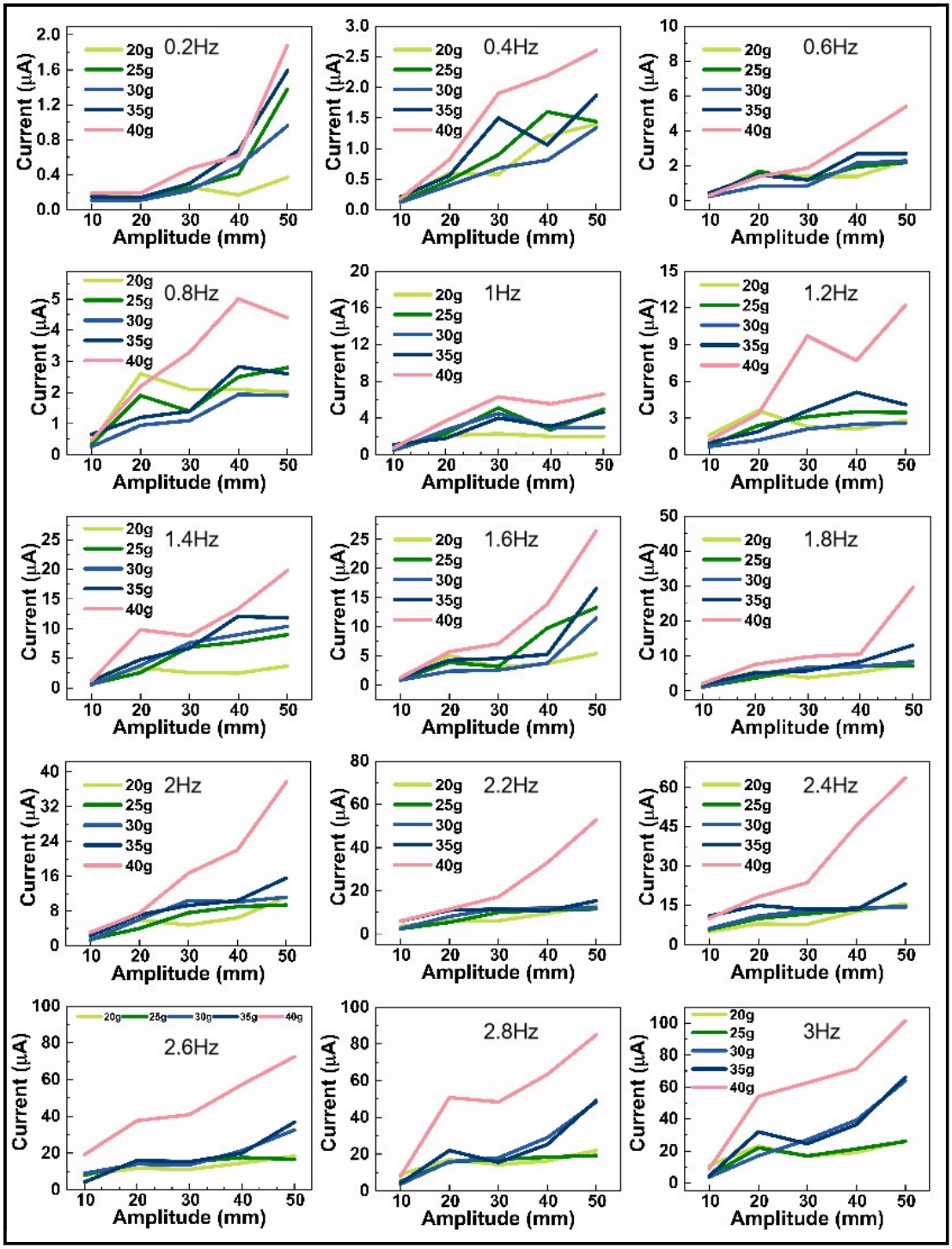

Fig. S5 Short-circuit currents of five LI-TENGs with different copper block masses at fixed frequencies and different amplitudes in the horizontal reciprocating motion of a linear motor.

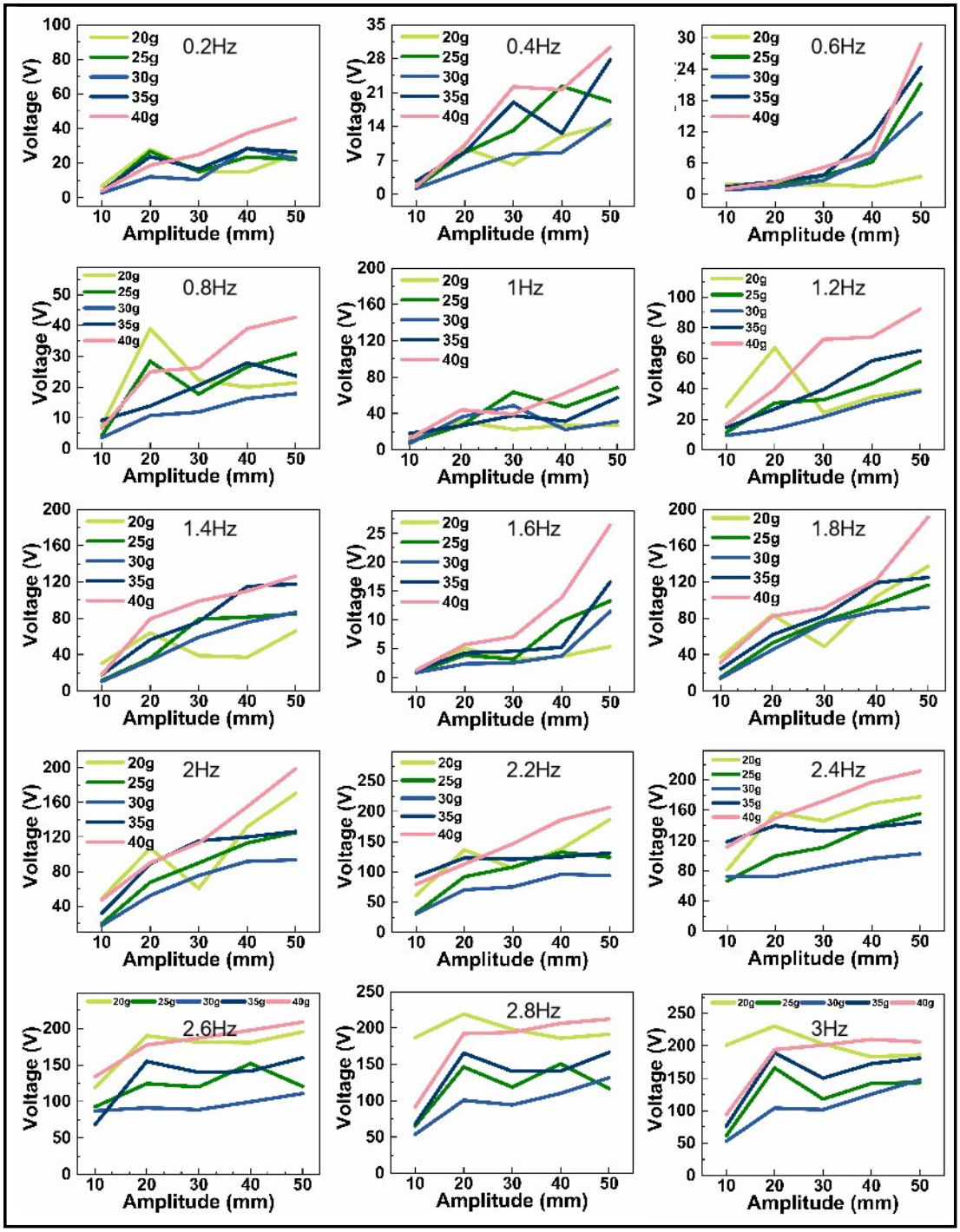

Fig. S6 Open-circuit voltages of five LI-TENGs with different copper block masses at fixed frequencies and different amplitudes for the horizontal reciprocating motion of a linear motor.

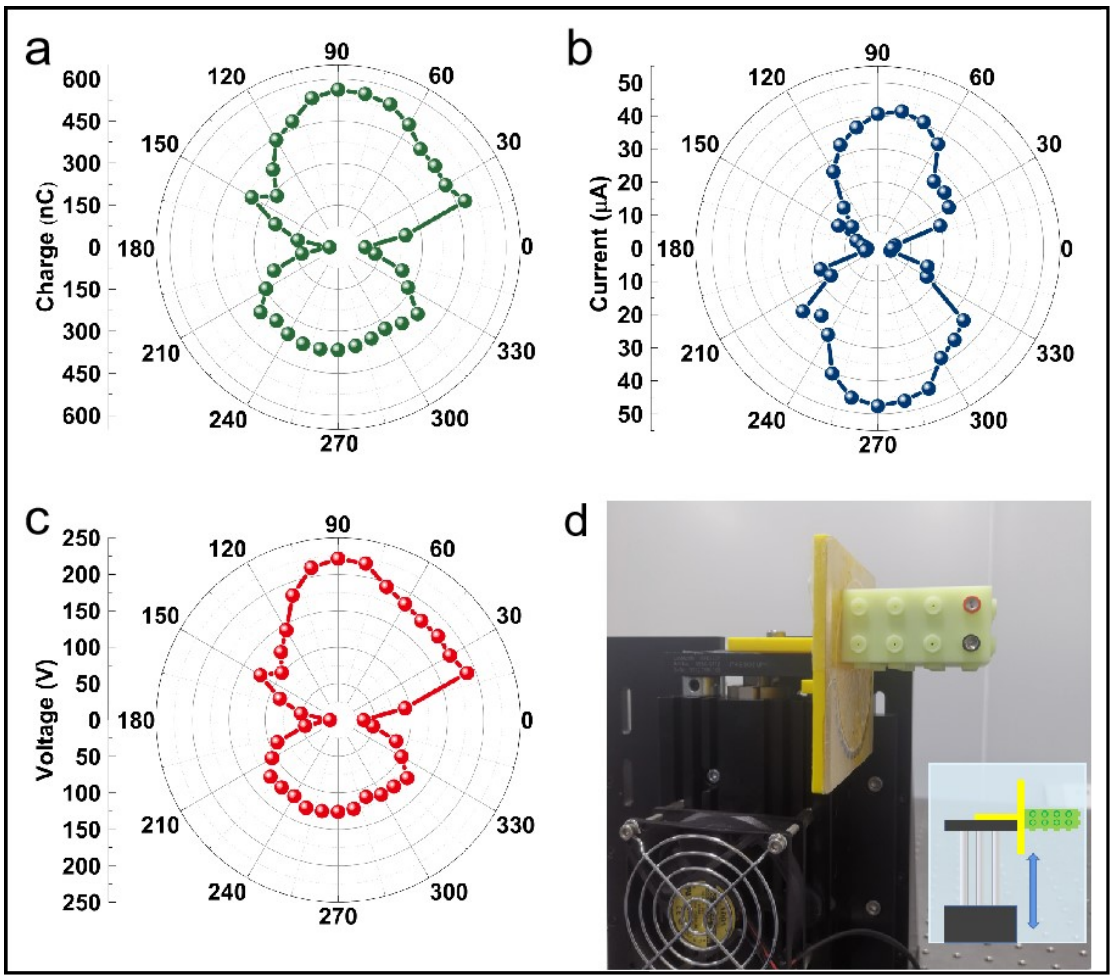

Fig. S7 The output performance of a single LI-TENG at different α angles in the vertical direction. (a) Short-circuit transfer charge. (b) Short-circuit current. (c) Open-circuit voltage. (d) Output performance test device at α angle in the vertical direction.

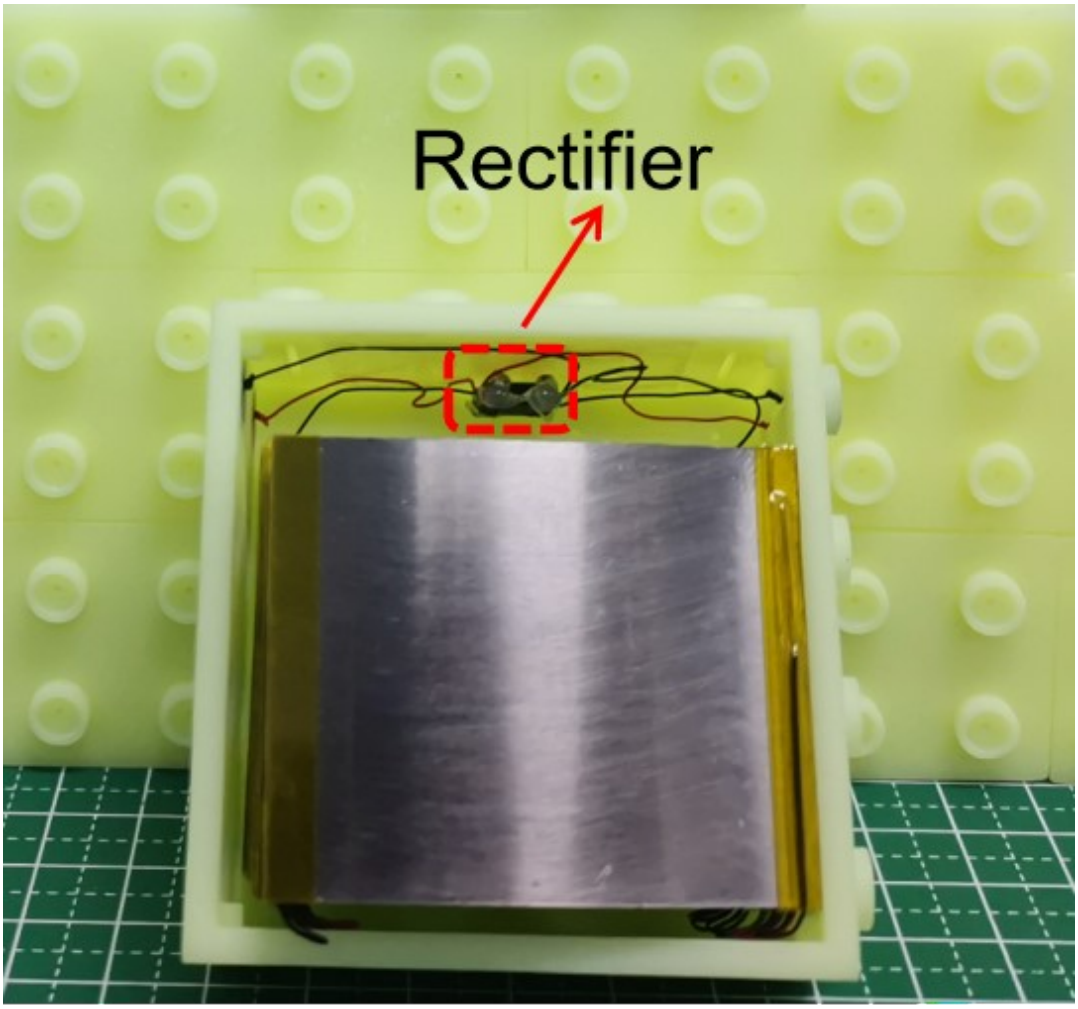

Fig. S8 LI-TENG internal structure physical photos.

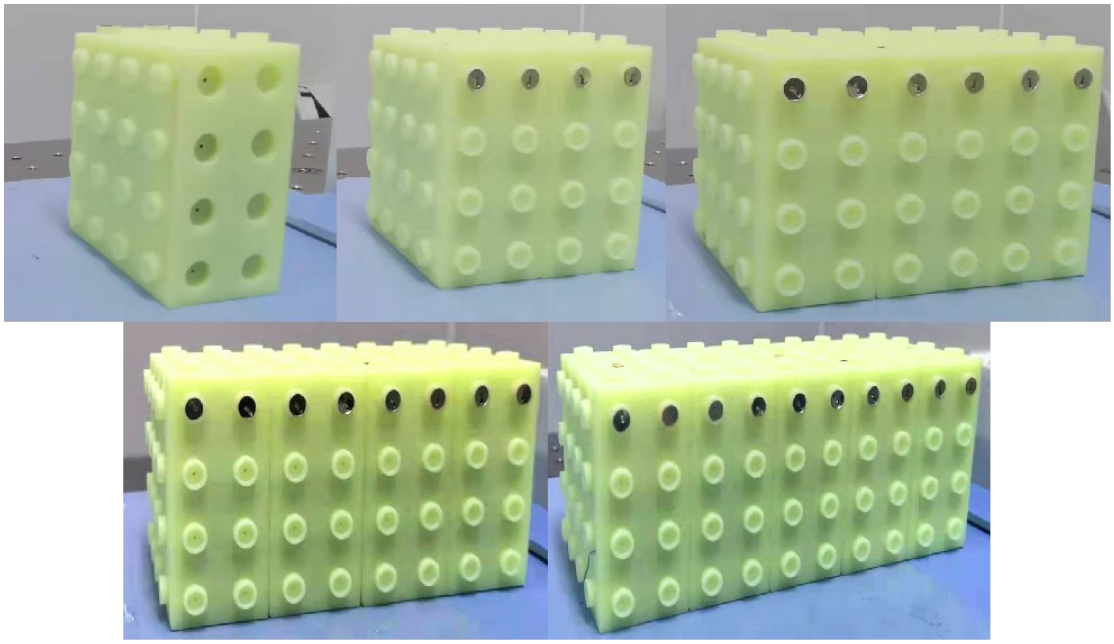

Fig. S9 Physical photo of different numbers of LI-TENG in parallel in the horizontal direction.

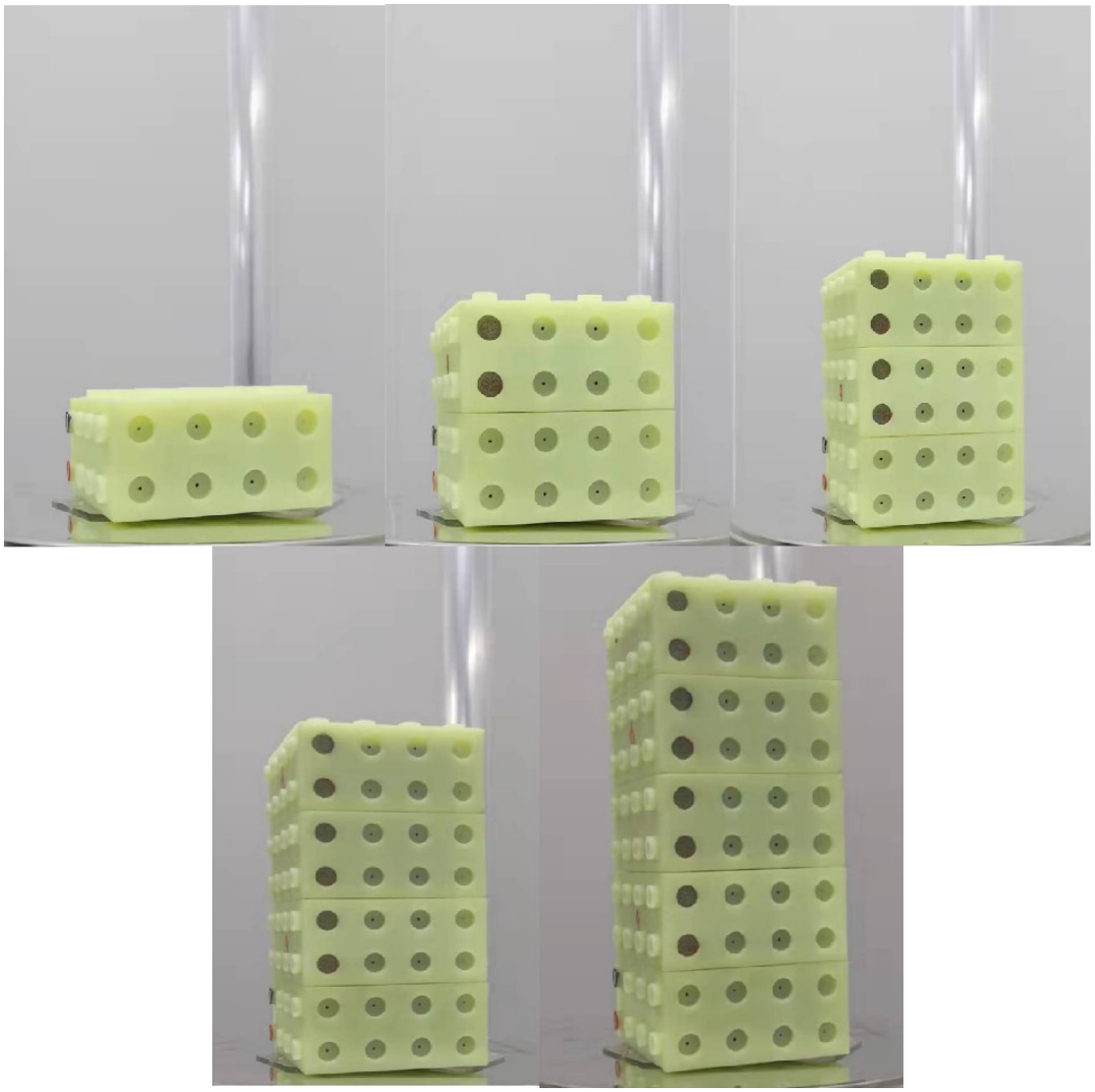

Fig. S10 Physical photos of different numbers of LI-TENG in parallel in the vertical direction.

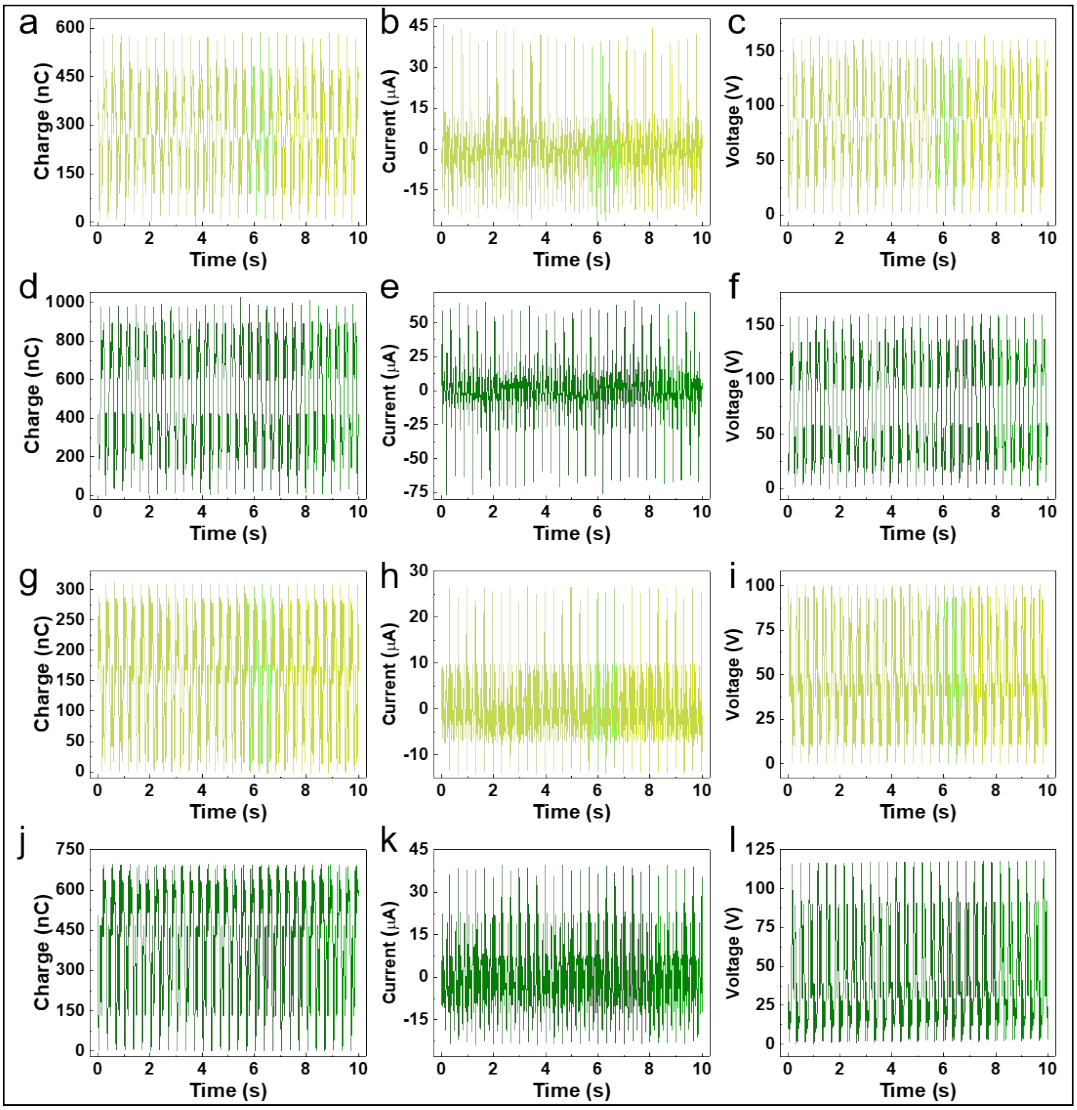

Fig. S11 Output curves for a single LI-TENG and two LI-TENGs in the horizontal and vertical directions. (a-c) Charge, current, and voltage output curves for a single LI-TENG in the horizontal direction. (d-f) Charge, current, and voltage output curves for two LI-TENGs in the horizontal direction. (g-i) Charge, current, and voltage output curves for a single LI-TENG in the vertical direction. (j-l) Charge, current, and voltage output curves for two LI-TENGs in the vertical direction.

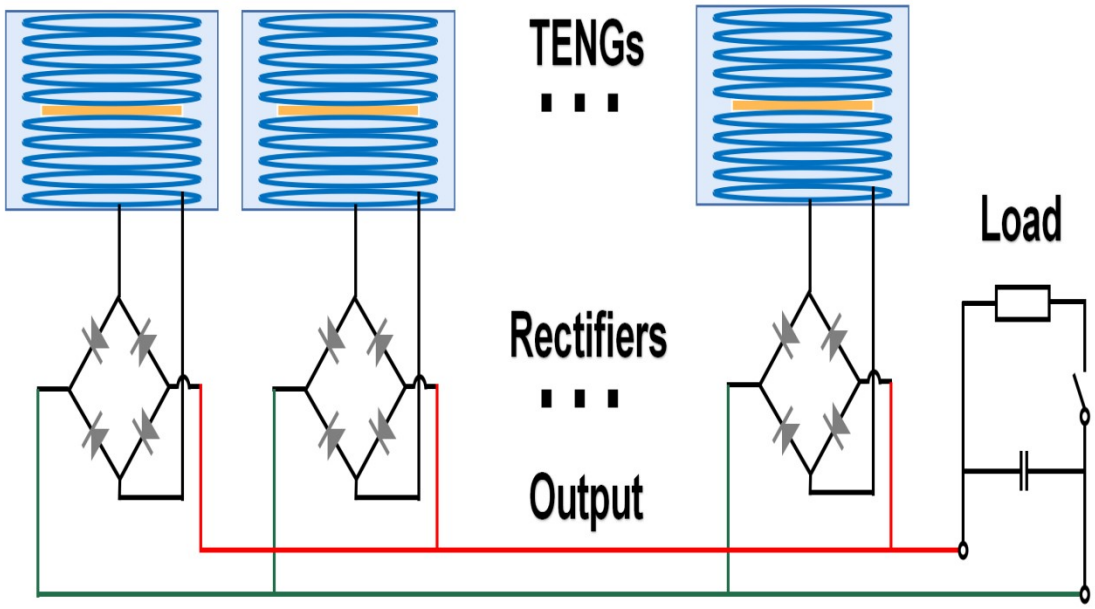

Fig. S12 Schematic diagram of the parallel circuit of LI-TENGs.

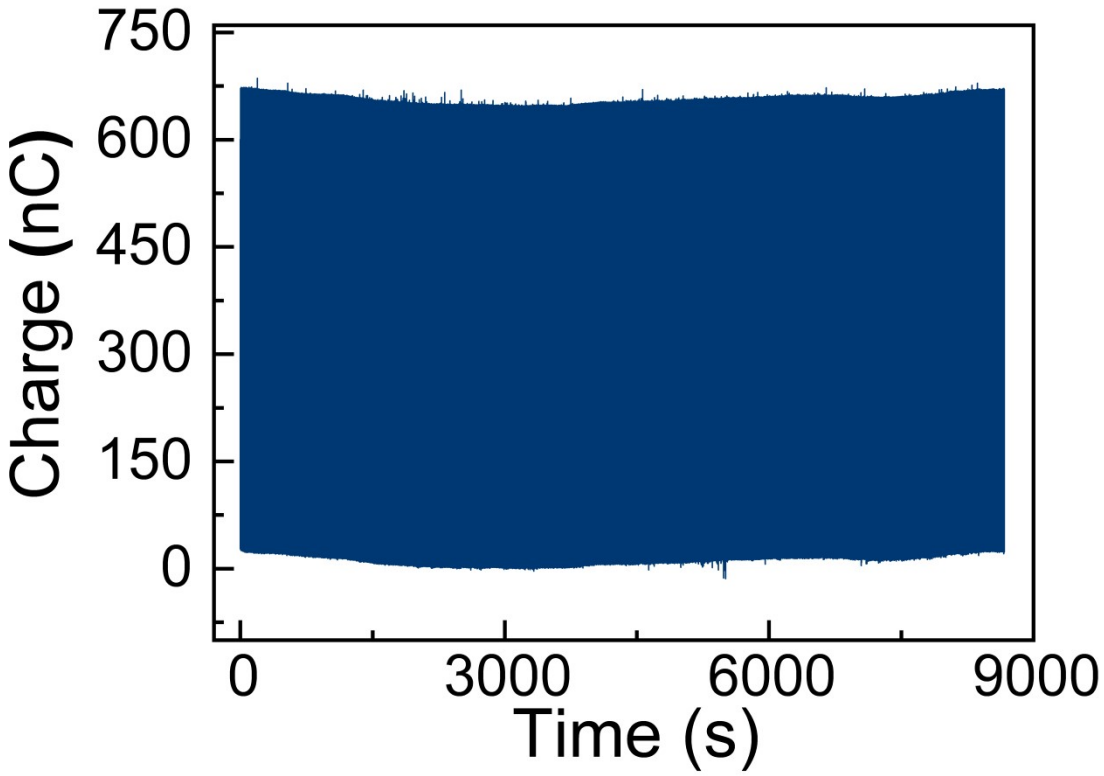

Fig. S13 LI-TENG short-circuit charge transfer amount operating at 26,000 cycles with linear motor horizontal reciprocating motion (20mm 3Hz).

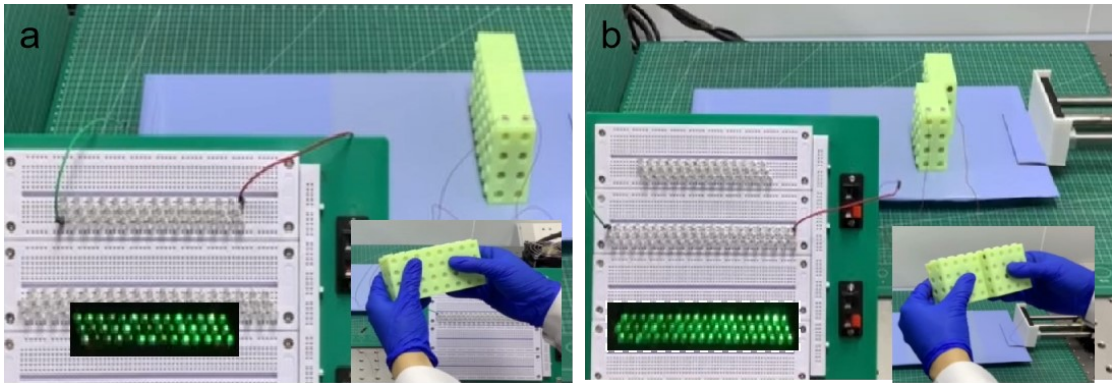

Fig. S14 Two types of splicing demonstration photos between LI-TENG. (a) parallel splicing. (b) series splicing.

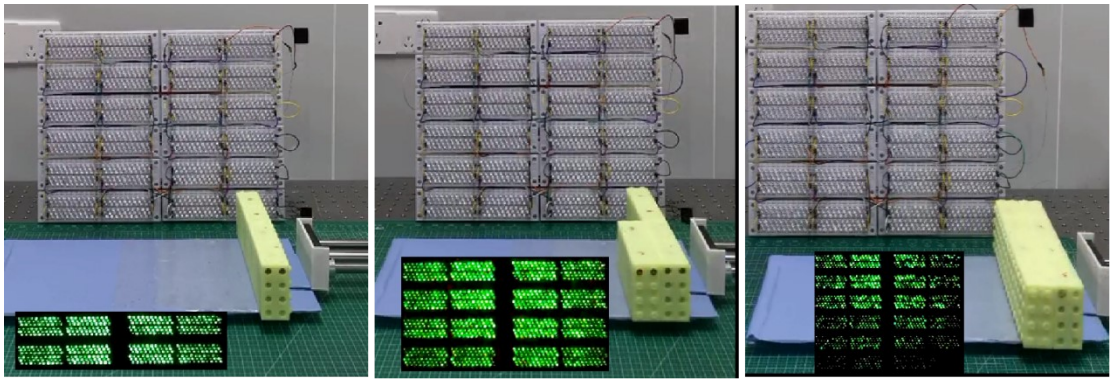

Fig. S15 Four, six, and eight LI-TENGs are stacked in parallel to light up 480, 960, and 1440 LEDs under the horizontal mechanical vibration of the linear motor.

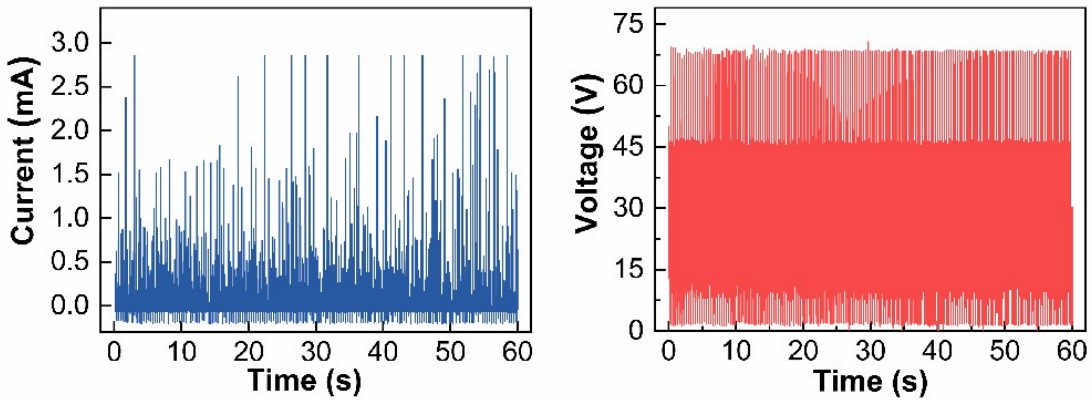

Fig. S16 Output current and voltage of 12 LI-TENG assembled and stacked into L-shaped squares under mechanical vibration of the linear motor in the vertical direction.

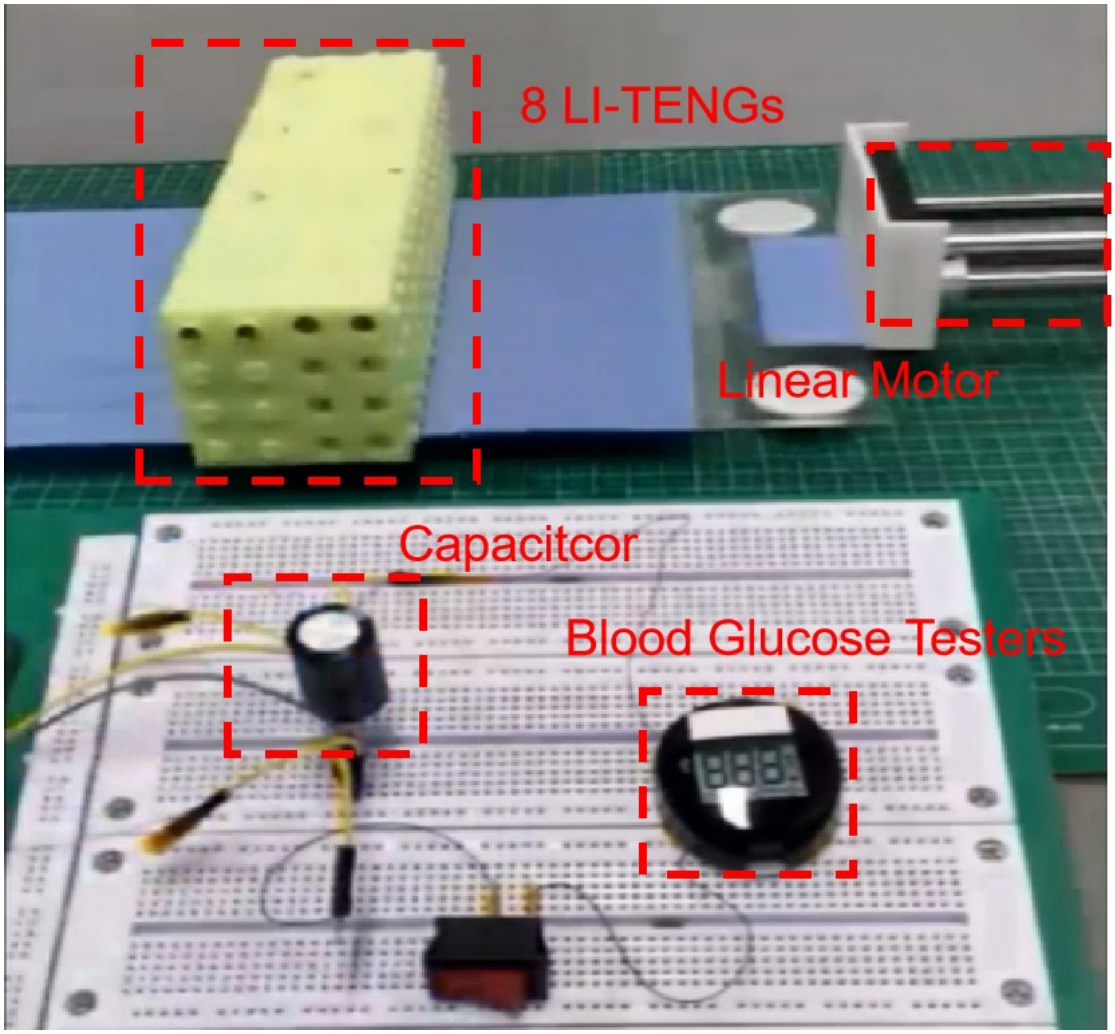

Fig. S17 8 LI-TENGs drive a portable blood glucose meter after charging a 2.2mF capacitor to 3.5V for 410 seconds under the horizontal reciprocating motion of a linear motor.

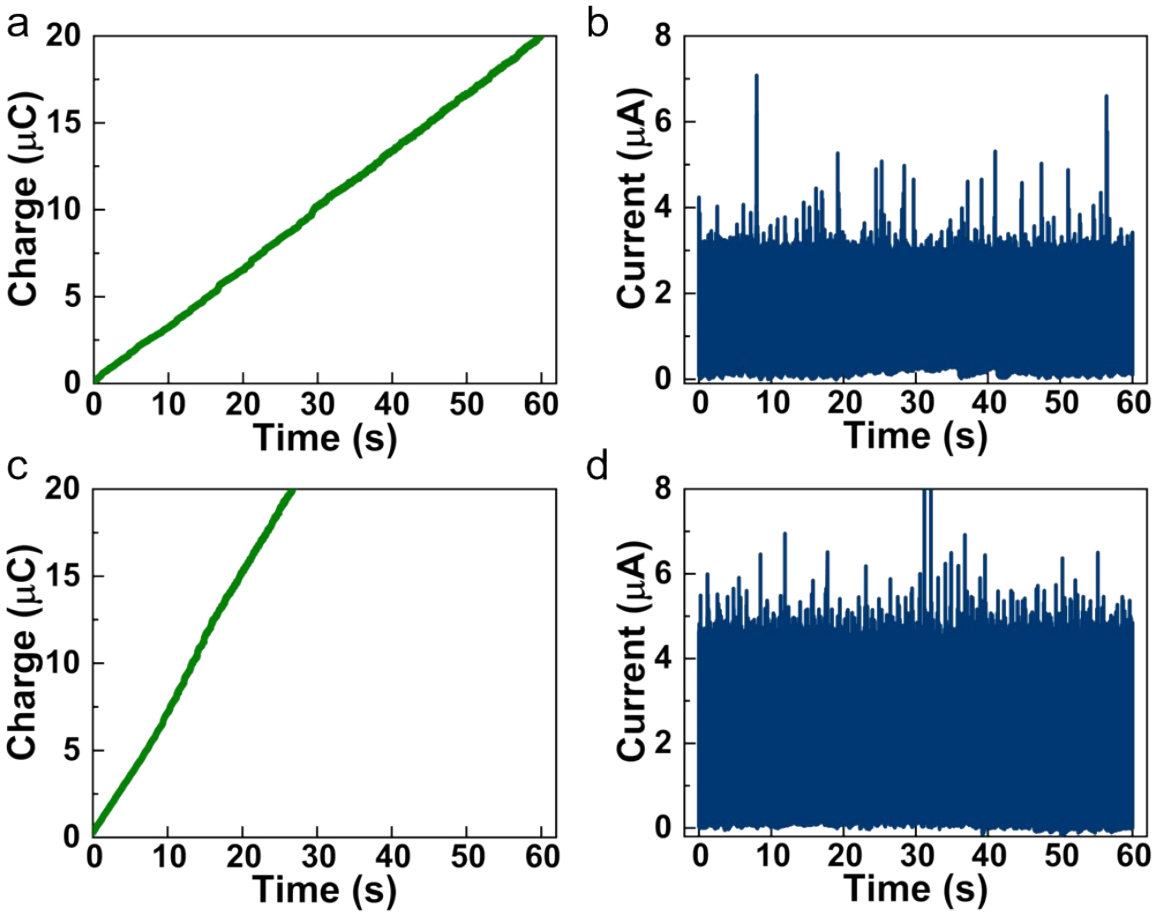

Fig. S18 The output performance of LI-TENGs driven by 1 Hz water waves in a wave-making pool. (a) charge transfer. (b) short-circuit current for a single LI-TENG. (c) charge transfer. (d) short-circuit current for 4 LI-TENGs.

Table S1. Charge, current, and voltage output for ten different units in a single LI-TENG

	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**	**Unit 8**	**Unit 9**	**Unit 10**
Charge（nC）	68	53	56	62	64	57	63	67	64	66
Current（μA）	5.2	4.0	4.4	4.7	4.9	4.2	4.9	5.1	5.0	5.1
Voltage（V）	166	150	155	158	162	154	161	167	163	164

Supplementary Videos:

Video S1: LI-TENGs series and parallel splicing demonstration.

Video S2: Different numbers of LI-TENGs in parallel light up the LEDs.

Video S3: 12 LI-TENGs in a L-shaped square charge 940 μF capacitors to 3.5 V to drive two electronic calculators and an electronic thermohygrometer.

Video S4: LI-TENGs harvest mechanical energy to drive portable electronic glucose meters.

Video S5: LI-TENGs harvest the mechanical energy of a bicycle in motion to power the nighttime warning light.