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Claims/Statements

1. A triboelectric nanogenerator (TENG), comprising:
  - at least one triboelectric (TE) layer comprising two surfaces relative
  - 5 movement between which generates a TE charge; and
  - a circuit comprising:
    - a switch;
    - a sensor; and
    - a load,
  - 10 wherein the switch has an open condition in which the TE charge accumulates (the accumulated TE charge), and a closed condition in which the accumulated TE charge discharges between the two surfaces across the load, the sensor determining a time constant ( $\tau$ ) of discharge of the accumulated TE charge across the load.
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2. The TENG of claim 1, being a contact-separation TENG having a releasing height determined based on spacing between the two surfaces and energy density on release.
- 20 3. The TENG of claim 1 or 2, wherein the circuit further comprises a diode for preventing the accumulated TE charge from discharging across the sensor during only one of pressing the two surfaces together and releasing the two surfaces to enable the two surfaces to move apart.
- 25 4. The TENG of claim 1 or 2, wherein the sensor is configured to determine a polarity of the accumulated TE charge based on a direction of discharge between the two surfaces.
- 30 5. The TENG of claim 4, wherein the sensor is configured determine a derivative of force with respect to time, based on a peak voltage of the accumulated TE charge that is discharged across the sensor.

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6. The TENG of any one of claims 1 to 5, wherein the switch operates cyclically based on a clock signal, each cycle comprising switching the switch from the open condition to the closed condition and back to the open condition.

5        7. The TENG of claim 6, wherein the clock signal cycles the switch at a frequency of at least 20Hz.

8. The TENG of claim 6, wherein the clock signal cycles the switch at a frequency of at least 40Hz.

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9. The TENG of claim 6, wherein the clock signal cycles the switch at a frequency of at least 80Hz.

10.The TENG of any one of claims 6 to 9, wherein the switch comprises a  
15 transistor.

11.The TENG of claim 10, wherein the transistor is a metal oxide semiconductor field effect transistor (MOSFET).

20        12.The TENG of any one of claims 1 to 11, wherein the sensor comprises the load.

13.The TENG of any one of claims 1 to 12, comprising a plurality of said TE layers.

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14.A self-powered weight scale comprising the TENG of claim 3, wherein the diode prevents the accumulated TE charge from discharging across the sensor during release.

30        15.A gesture sensor comprising the TENG of any one of claims 1 to 13 positioned to receive at least one or compressive force, tensile force and shear force during performance of a gesture.

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16.A tilt angle sensor comprising the TENG of any one of claims 1 to 13 positioned to receive at least one of compressive force and tensile force during variation of an angle between two bodies or parts.