Electronic Supplementary Material (ESI) for Energy & Environmental Science.

Supplementary Information

Mesoporous Pores Impregnated with Au Nanoparticles as Effective Dielectrics for Enhancing Triboelectric Nanogenerator Performance under Harsh Environment

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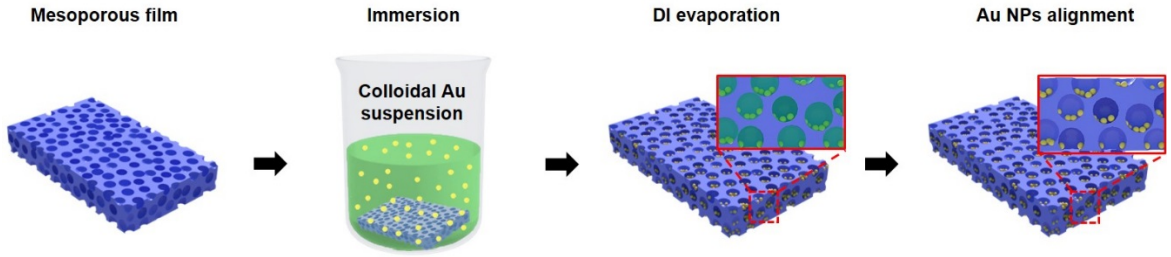

Fig. S1. The schematic fabrication process of the Au NPs embedded mesoporous films.

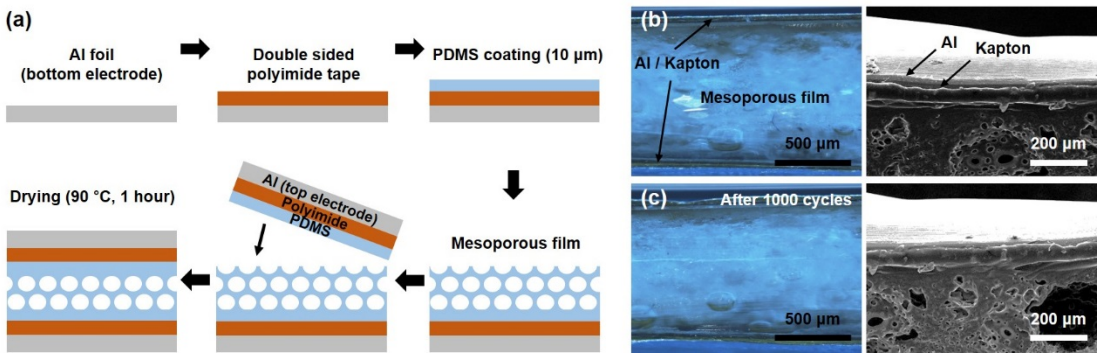

Fig. S2. (a) Schematic diagrams of the fabrication process for the top and bottom electrode of the AMTENG without airgap. Cross-sectional optical and SEM images of the AMTENG without airgap (b) before and (c) after the generator operates for 1000 cycles.

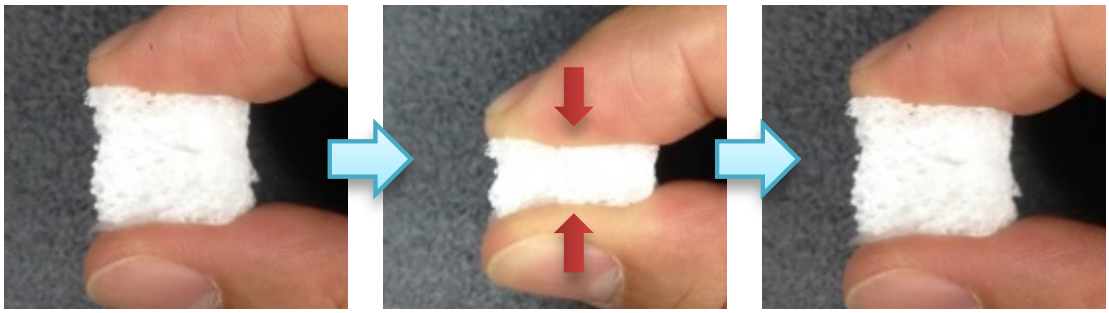

Fig. S3. The video shows a manual compression test of the mesoporous film with a volume reduction of over 50 %.

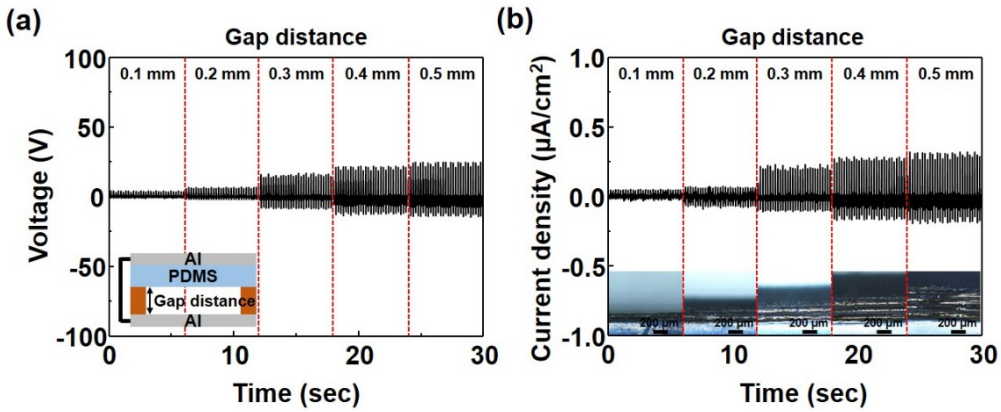

Fig. S4 (a) Output voltage and (b) current density of the general two-layer triboelectric nanogenerators with various airgaps from 0.1 mm and 0.5 mm under the same mechanical force. The insets show schematic image of the general TENG and optical images of spacers to maintain gap distance.

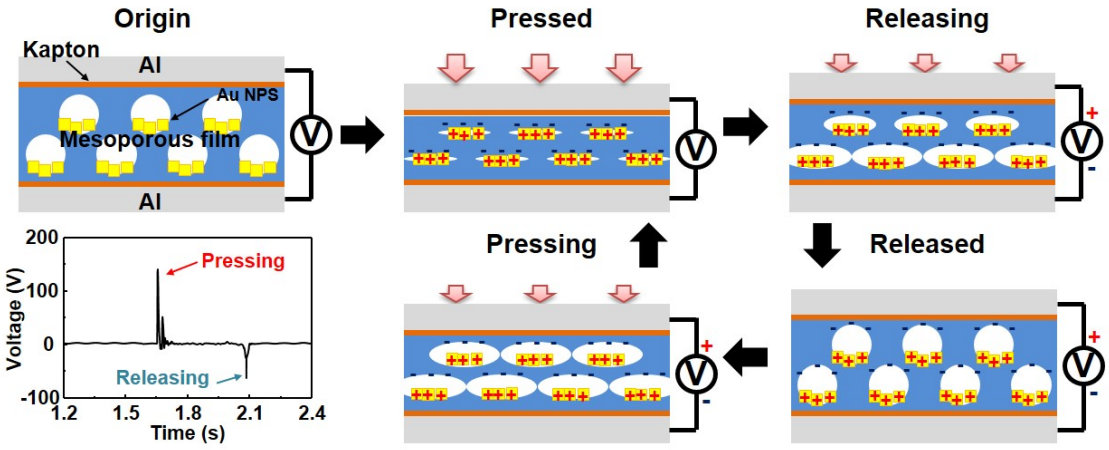

Fig. S5. Charge generation mechanism and measurement systems of the AMTENG under external force at open-circuit condition.

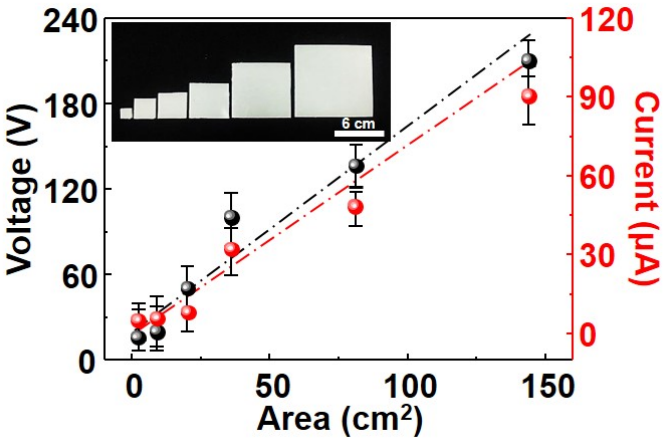

Fig. S6. Output voltage and current of the AMTENG with the active area. The electrical output performance also increases almost linearly with the active area.

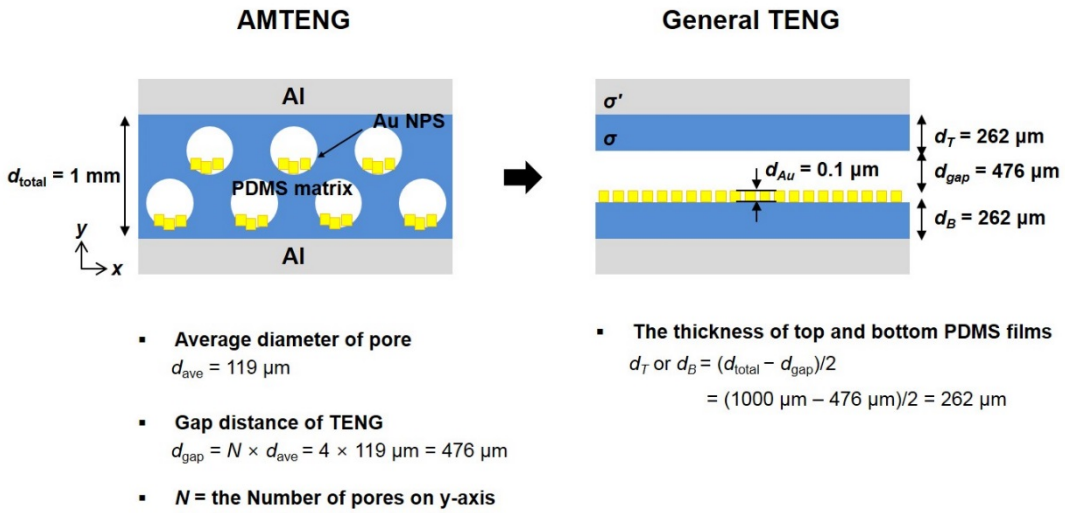

Fig. S6. The schematic images for the calculated surface charge density of AMTENG and description of parameters for calculations.

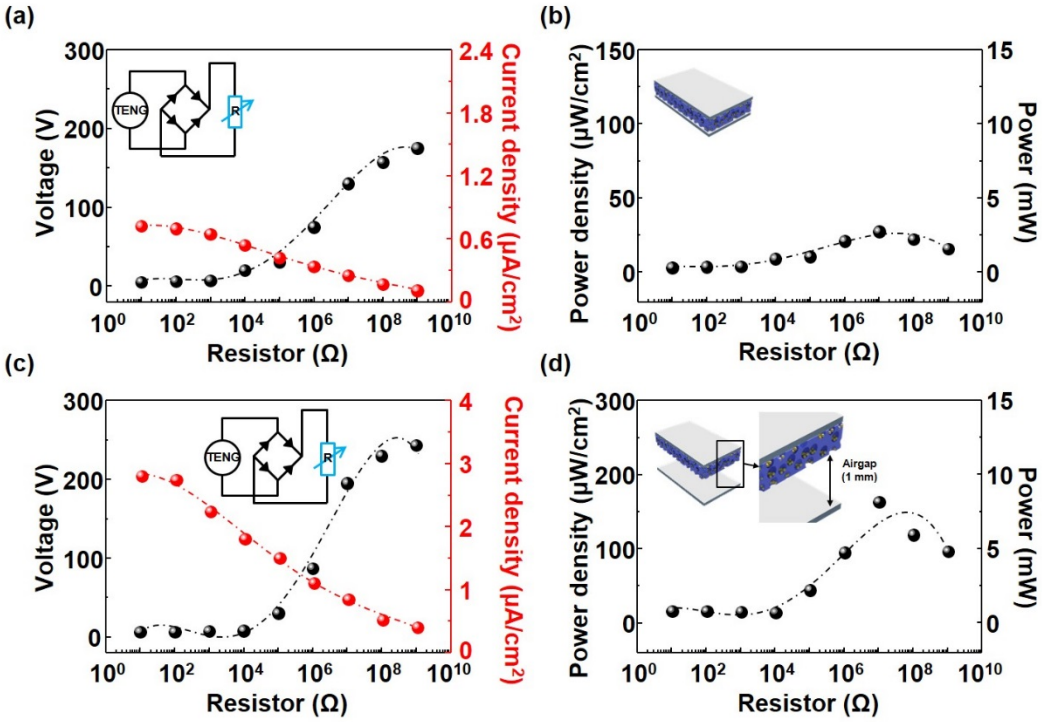

Fig. S7. (a) The rectified output voltage and current density, and (b) the rectified output power of the AMTENG without gap with the resistance of external loads from 10 to 10^9 Ω. (c) The rectified output voltage and current density, and (d) the rectified output power of the AMTENG with gap with the resistance of external loads from 10 to 10^9 Ω.