

Supplementary Materials

Figure S1 shows the fabrication process of the PDMS secondary structures by conventional exposure, development and molding method. The 7 μm AZ P4620 photoresist film was produced by spin coating process (2500 rpm for 35 s) and soft baking (95 $^{\circ}\text{C}$ for 10 min) (Figure S1a). Next, a mask containing the arrayed microholes was pressed against the film and a UV light was passed through this mask from the top side for 15 s (Figure S1b). A precise development of the wafer was then performed in a solution of 0.5 wt % NaOH, and a microholes array was formed in the photoresist film as a mold (Figure S1c). After that, the photoresist mold was filled with liquid PDMS through drop casting, followed by spin coating process at 1500 rpm for 40 s (Figure S1d). Subsequently, the PDMS was cured for 2 h at 85 $^{\circ}\text{C}$ and demolding from the photoresist mold to obtain the PDMS secondary structure equipped with arrayed micropillars (Figure S1e).

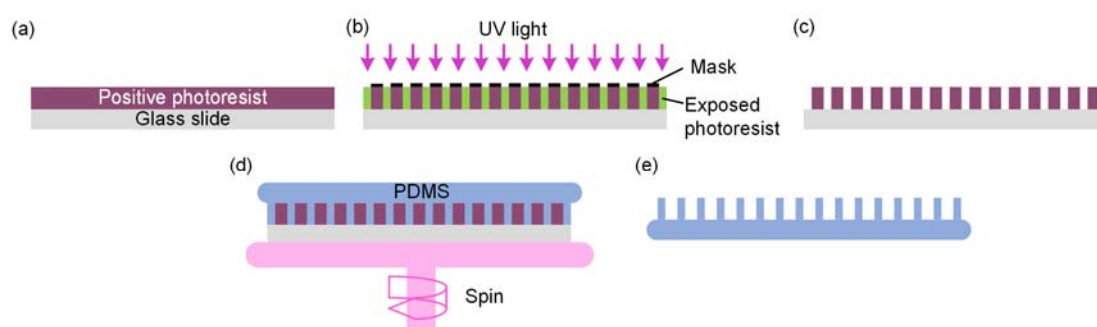


Figure S1. Schematic illustration of PDMS secondary structure fabrication process: (a) spin coating the photoresist film, (b) UV light irradiation through a mask containing the arrayed microholes, (c) development to form a microholes array, (d) drop casting liquid PDMS, (e) demolding to obtain the PDMS secondary structure.

Figure S2 gives the real photo and schematic illustration of the fabricated TENG device.

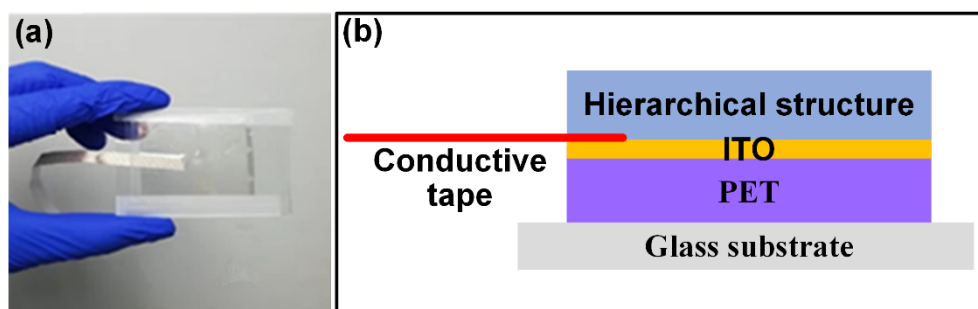


Figure S2. (a) Photo and (b) schematic illustration of the fabricated TENG device.

Figure S3 presents the static contact angle and the sliding angle of the flat PDMS film. It showed a contact angle of 100 $^{\circ}$ and a sliding angle of 74 $^{\circ}$.

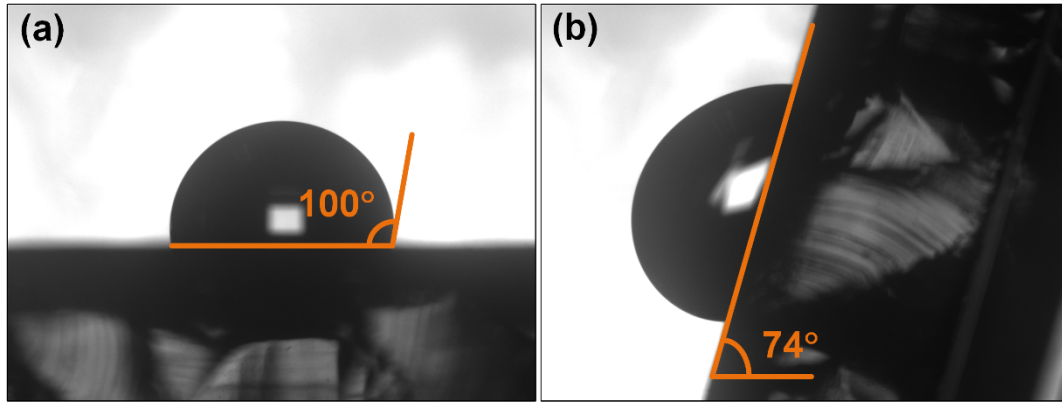


Figure S3. (a) Static contact angle and (b) sliding angle of the flat PDMS film.

Figure S4 shows contact angles of the hierarchical structures with a secondary micropillar center distance of 6 μm . When the center distance of the primary micropillars increased from 100 μm to 150 μm and 200 μm , the contact angle of the hierarchical film showed an upward trend from 155° to 160° and 165°.

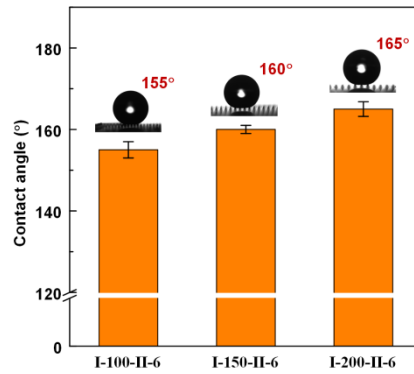


Figure S4. Contact angles of the hierarchical structures with a secondary micropillar center distance of 6 μm .

Figure S5 presents the noise level of the water-TENG device for output voltage measurement.

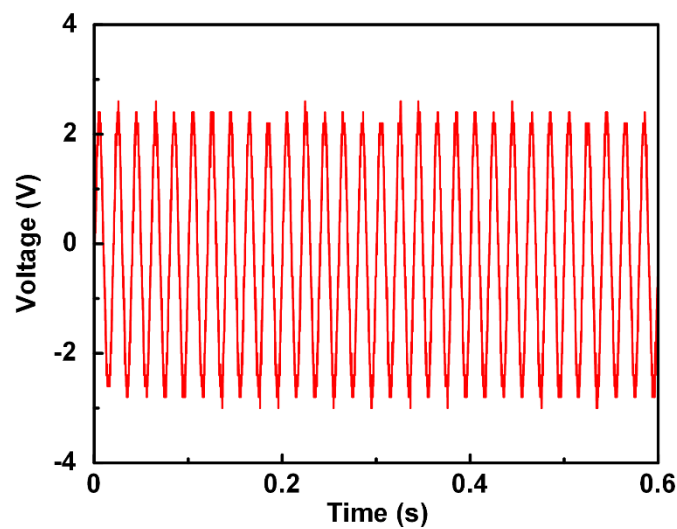


Figure S5. Noise level of the water-TENG device for output voltage measurement.