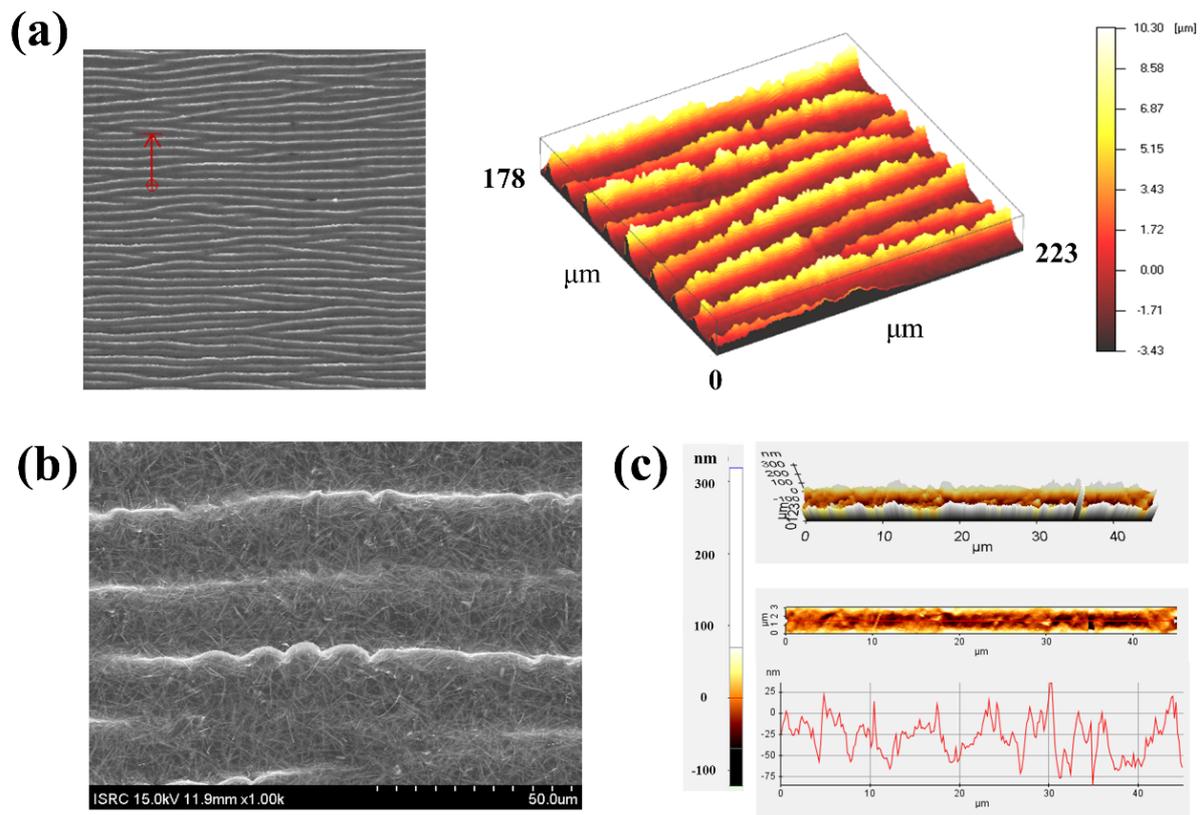


## Electronic Supplementary Information

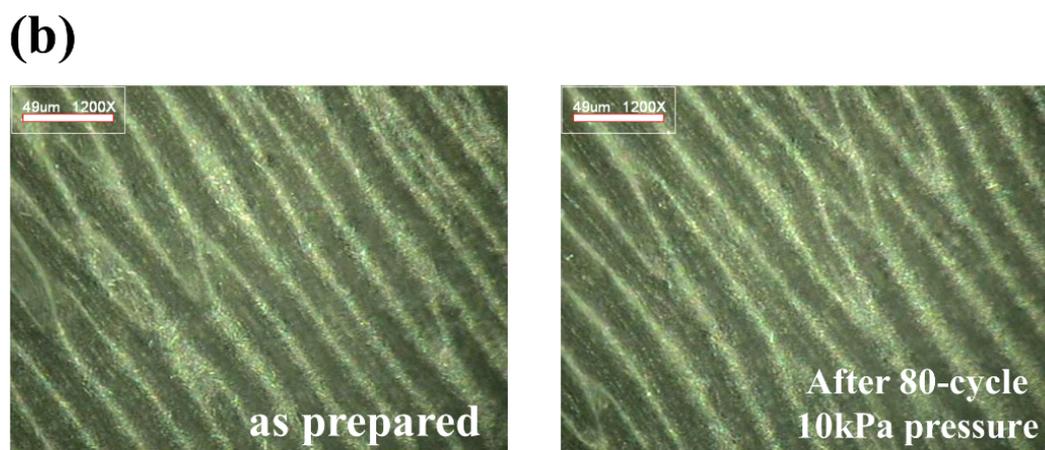
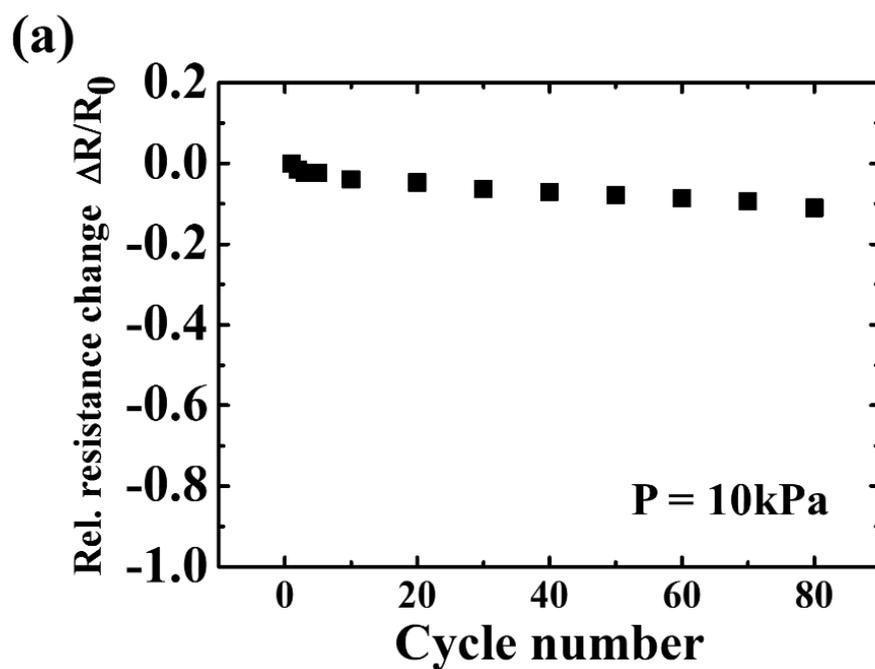
### **Silver Nanowire-embedded PDMS with Multiscale Structure for Highly Sensitive and Robust Flexible Pressure Sensor**

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**Figure S1.** The microstructure of the AgNW-embedded multiscale-structured PDMS electrode. (a) 3-D surface profiler image shows the multiscale structure of the AgNW- embedded PDMS electrode. (b) Top view SEM images of the AgNW-embedded PDMS electrode. SEM images show the rough surface of the crest. (c) AFM image and line profile of the trough of the multiscale-structured electrode. The root-mean-square (RMS) value of the measured line roughness at the trough is about 25 nm.



**Figure S2.** (a) The resistance change of the multiscale-structured electrode during the repeated loading/unloading of the pressure of 10 kPa. (b) The microscopic images of the as-prepared multiscale-structured electrode and the multiscale-structured electrode after 80-cycle test, respectively.

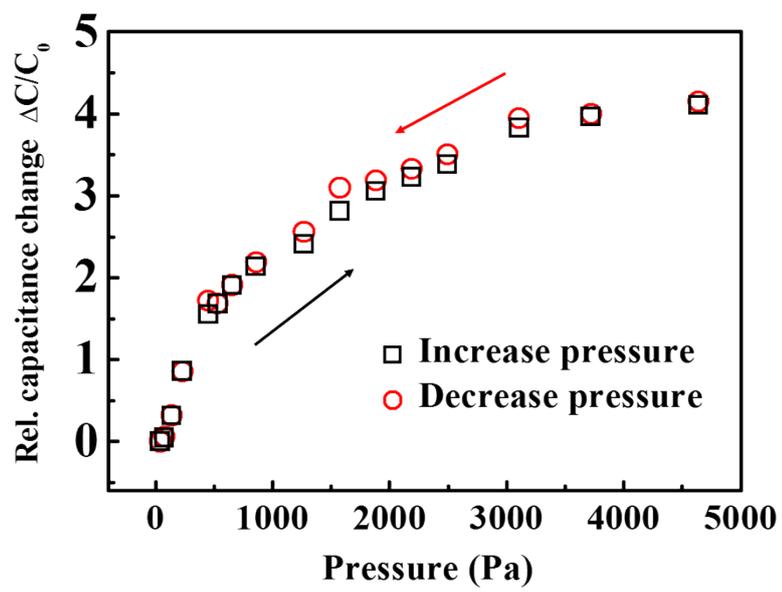
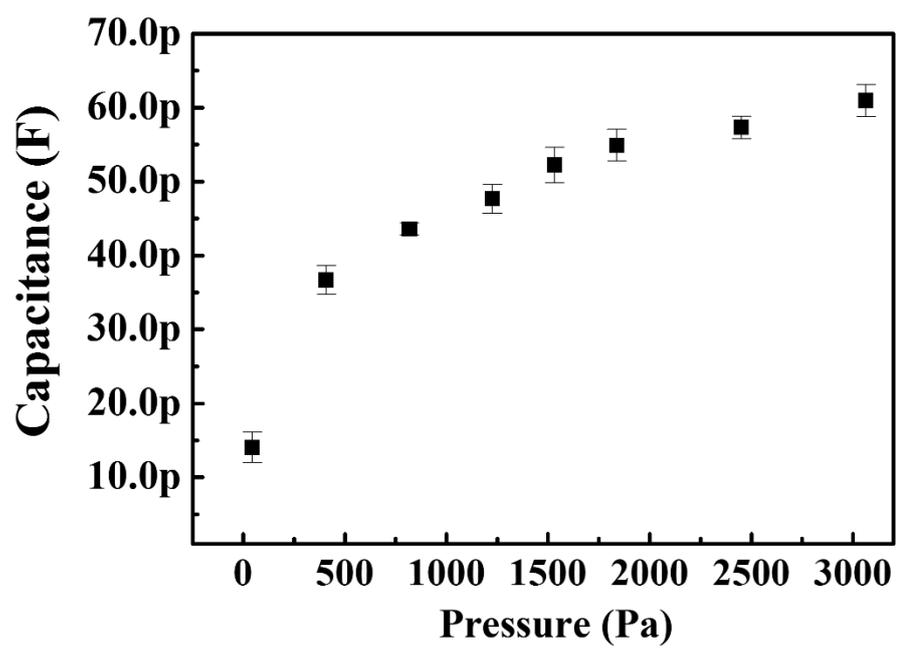
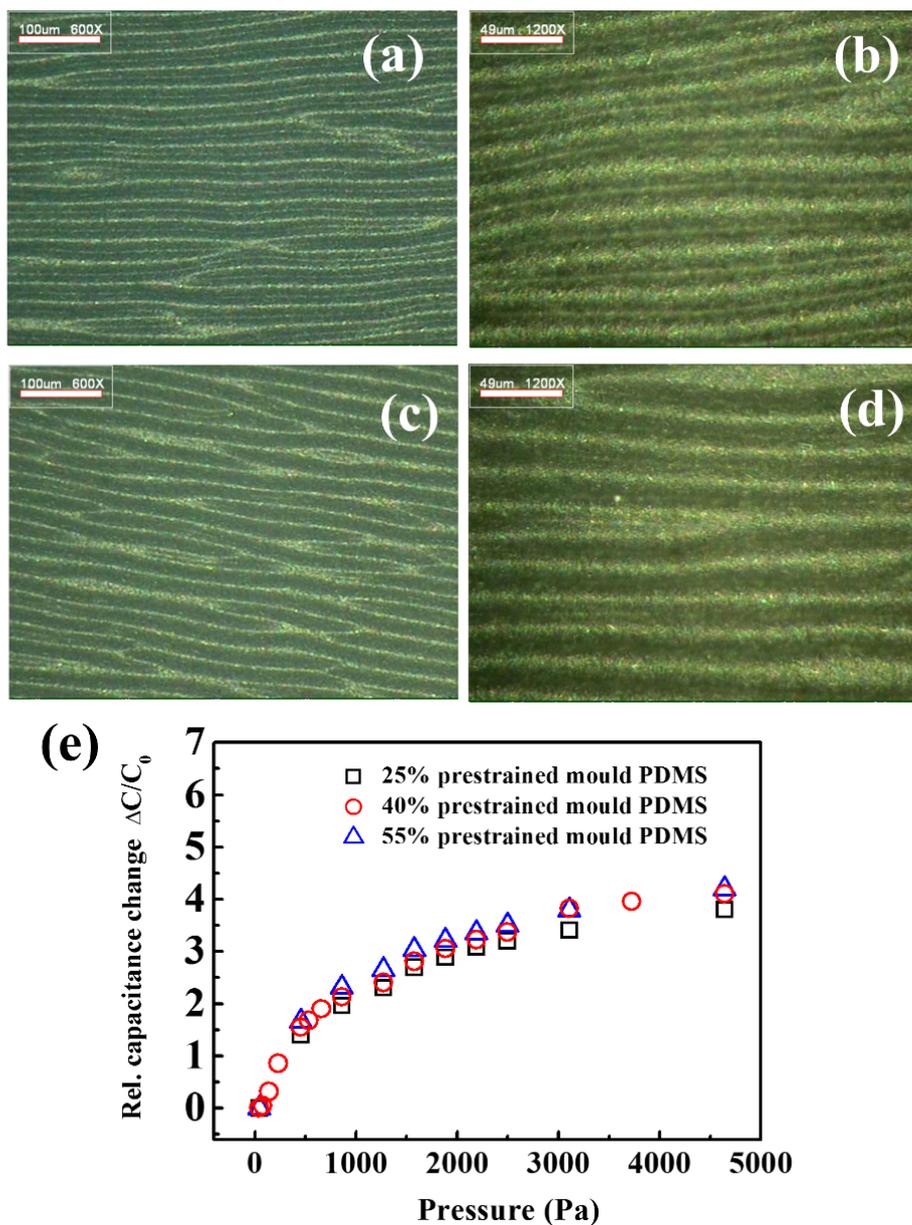


Figure S3. Relative capacitance change-pressure curves from the consecutive loading-unloading cycles

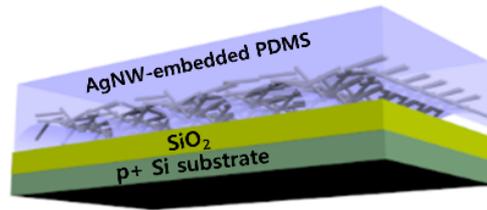


**Figure S4.** The capacitance-pressure curve of the pressure sensor. We tested ten independent samples and the error bars represent the standard deviation from ten samples.

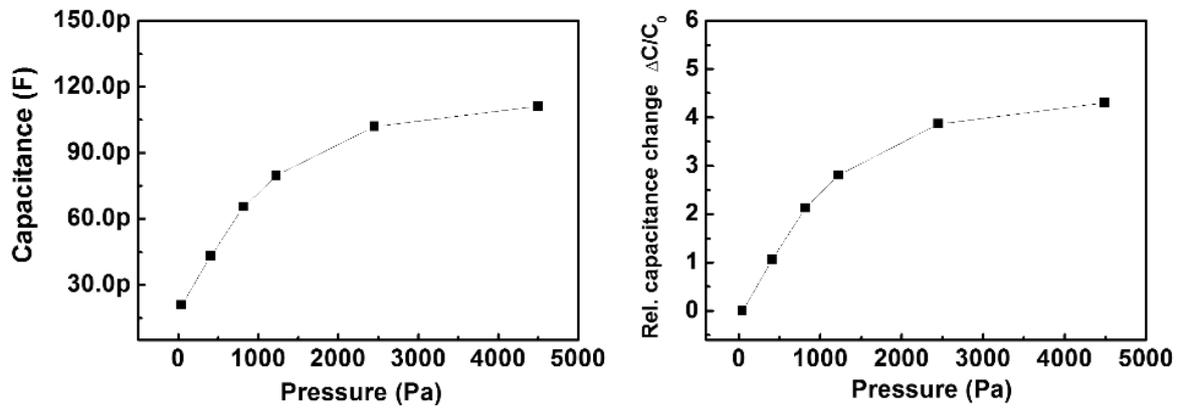


**Figure S5.** (a,b) Microscopic images of the multiscale-structured electrode obtained from the mould with pre-strain level of 25%. The average wavelength and amplitude are about 25  $\mu\text{m}$  and 5  $\mu\text{m}$ , respectively. (c,d) Microscopic images of the multiscale-structured electrode obtained from the mould with pre-strain level of 55%. The average wavelength and amplitude are about 22  $\mu\text{m}$  and 7  $\mu\text{m}$ , respectively. (e) Relative capacitance change-pressure curve of the sensors from the mould PDMS with different pre-strain level.

(a)



(b)



**Figure S6.** The pressure sensor with oxide dielectric layer. (a) Schematic diagram of the pressure sensor fabricated with the multiscale-structured electrode, SiO<sub>2</sub> dielectric layer (thermally grown, 200 nm) and p+ silicon substrate (b) Pressure-response curves of the pressure sensor.