

Supporting Information

Touchpoint-tailored ultra-sensitive piezoresistive pressure sensors with a broad dynamic response range and low detection limit

Ming Chen,[†] Kun Li,^{†,‡} Guanming Cheng,[†] Ke He,^{†,‡} Weiwei Li,^{†,‡} Daoshu Zhang,^{†,‡}
Weimin Li,[†] Ye Feng,[†] Lei Wei,[§] Wenjie Li,^{*,†} Guohua Zhong,^{*,†} and Chunlei Yang,^{*,†}

*[†]Center for Information Photonics and Energy Materials, Shenzhen Institutes of
Advanced Technology, Chinese Academy of Sciences, Shenzhen 518055, People's
Republic of China*

*[‡]Department of Nano Science and Technology Institute, University of Science and
Technology of China, Suzhou 215123, China*

*[§]School of Electrical and Electronic Engineering, Nanyang Technological University,
50 Nanyang Avenue, 639798, Singapore*

**Corresponding authors; email: liwj@siat.ac.cn; gh.zhong@siat.ac.cn;*

cl.yang@siat.ac.cn

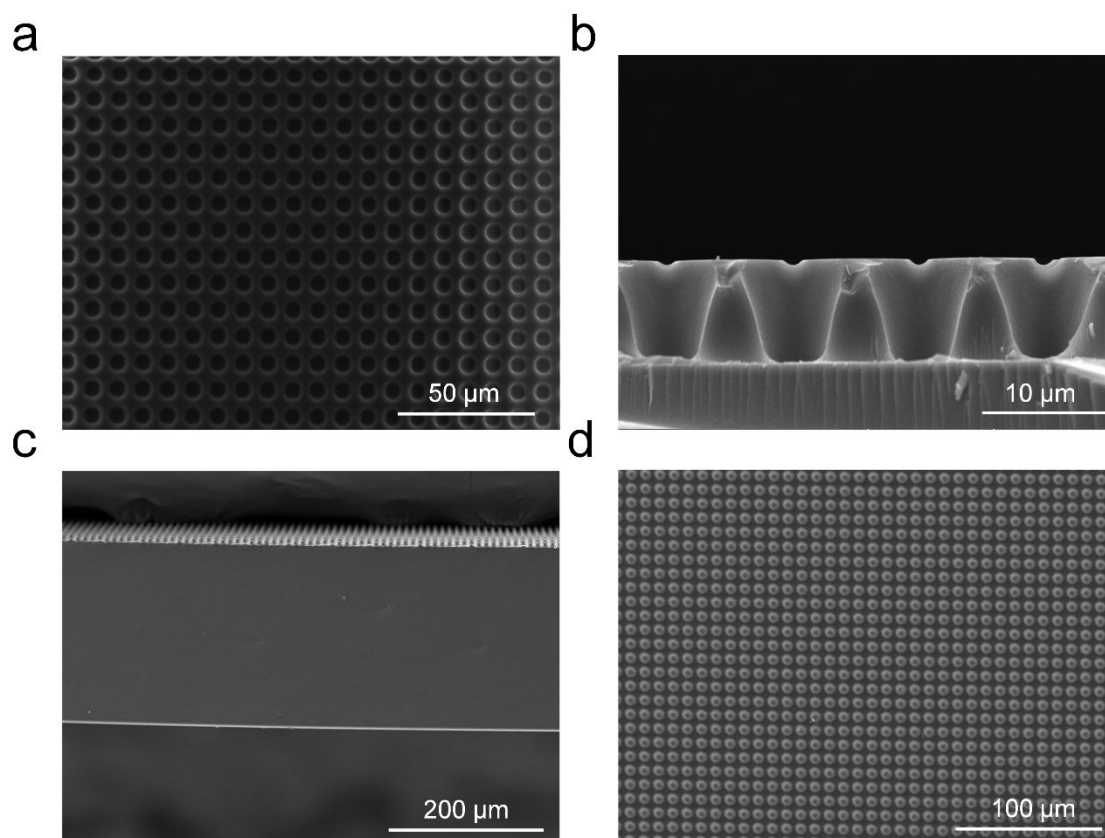


Figure S1. a-b. Top-view and cross-sectional SEM images of the AZ4620 photoresist.

c-d. Cross-sectional and top-view SEM images of the PDMS microstructures.

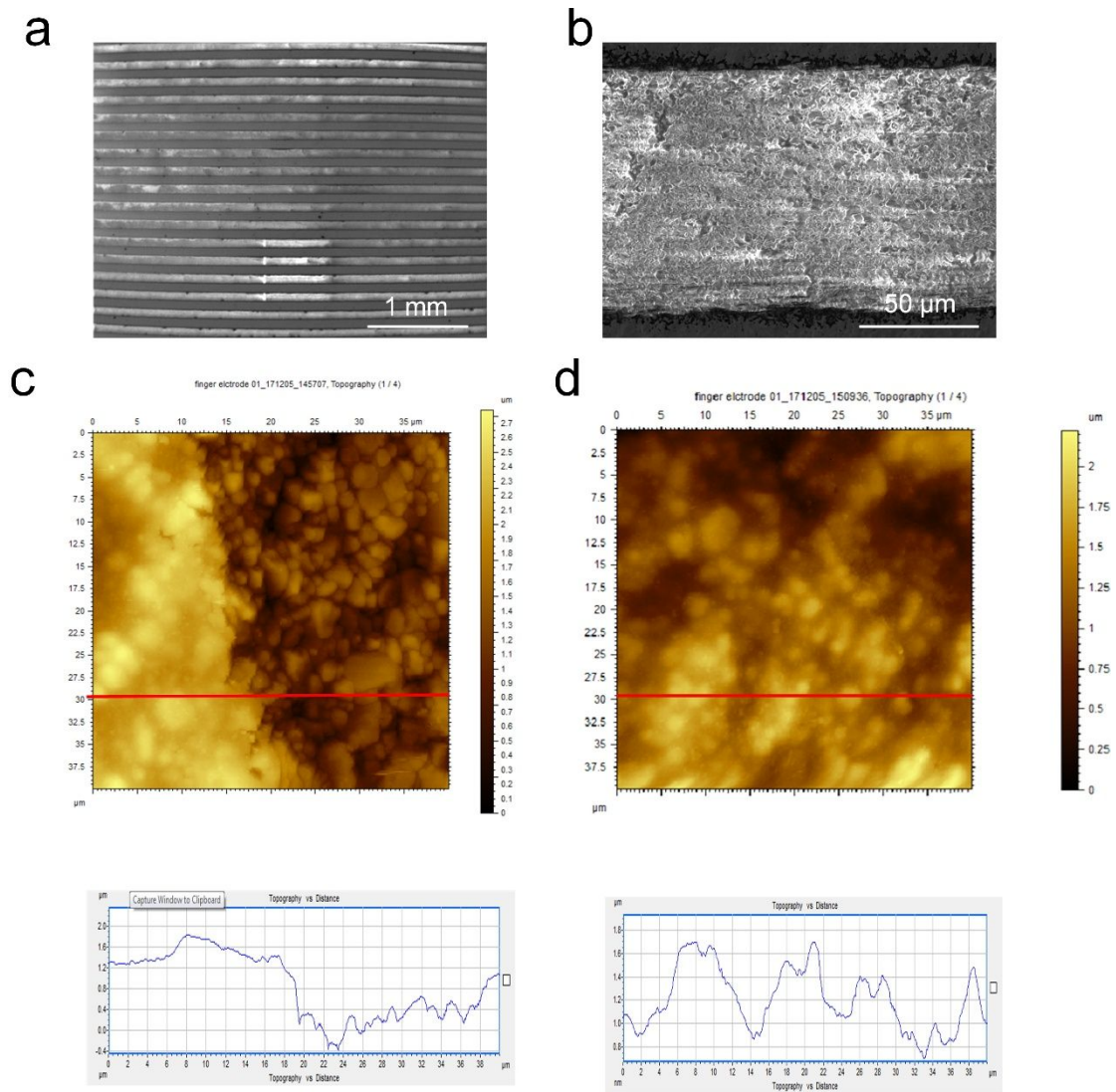


Figure S2. a-b. Top-view SEM images of the rough PI/Au interdigital electrodes. The width of a single interdigital electrode is 90 μm , the interval between two neighboring interdigital electrode is 120 μm . c-d. AFM images of PI/Au interdigital electrodes. The step height between the area with Au and without Au is ~ 1 μm . The peak to peak roughness of the electroplated Au is ~ 1.4 μm .

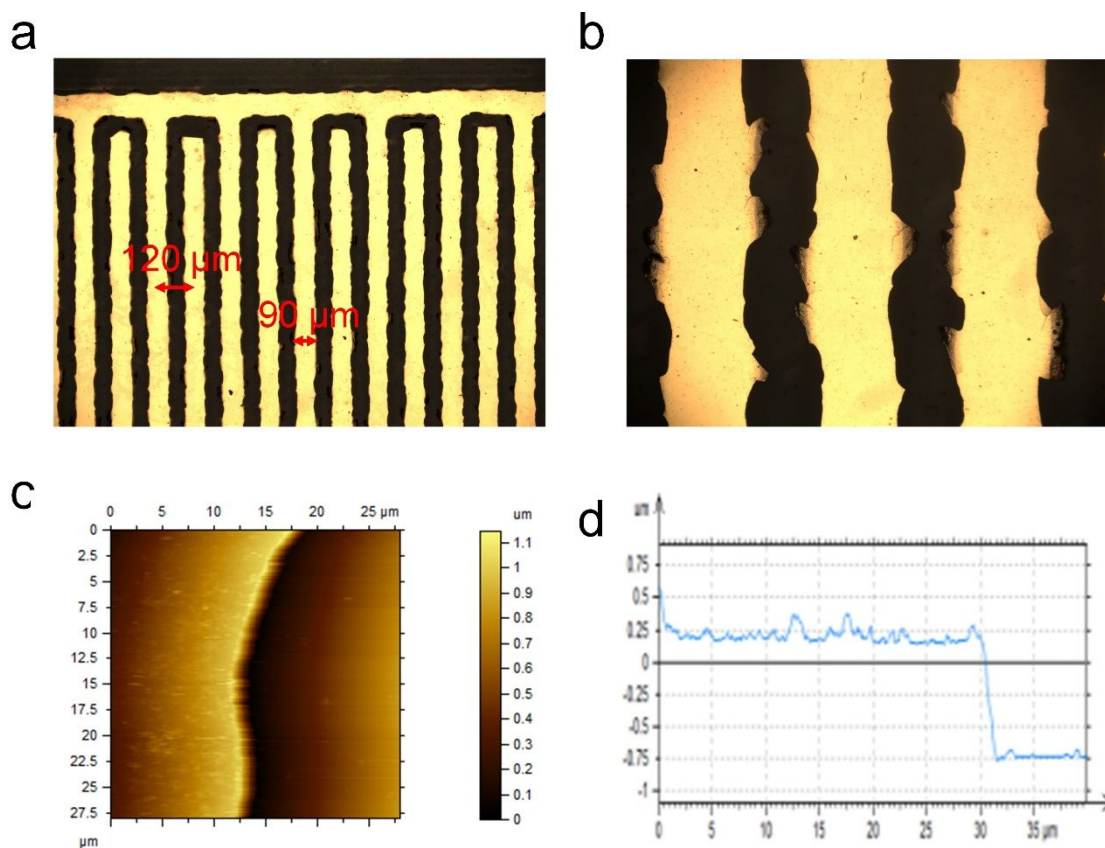


Figure S3. a-b. Top-view OM images of the smooth PI/Au interdigital electrodes. The width of a single interdigital electrode is $\sim 90 \mu\text{m}$, the interval between two neighboring interdigital electrode is $\sim 120 \mu\text{m}$. c. AFM images of smooth PI/Au interdigital electrodes. d. The step height between the area with Au and without Au is $\sim 1 \mu\text{m}$. The peak to peak roughness of the electroplated Au is $\sim 180 \text{ nm}$.

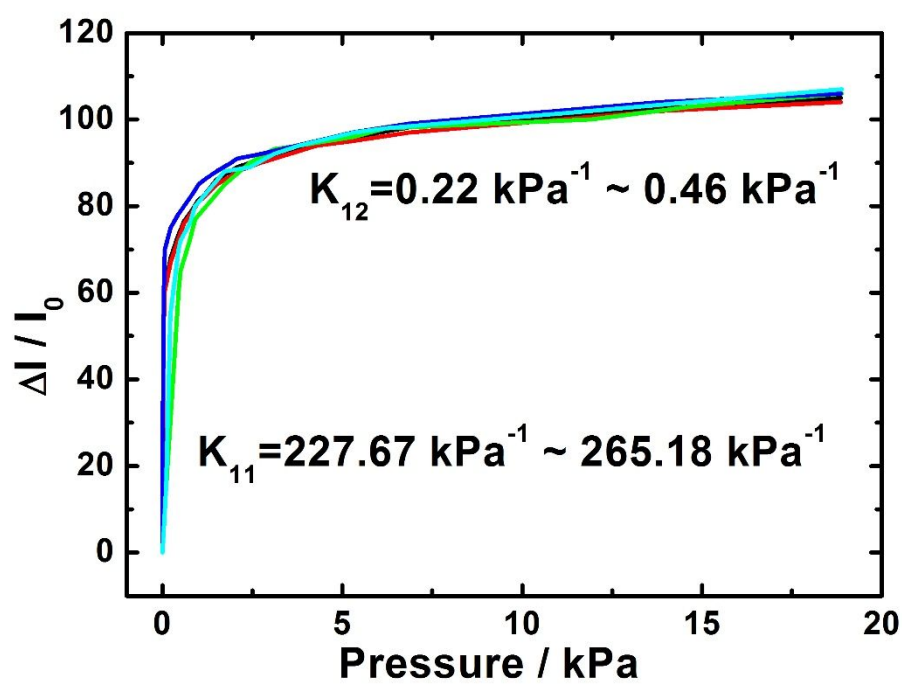


Figure S4. Pressure sensitivities of 5 Rough-Rough pressure sensors

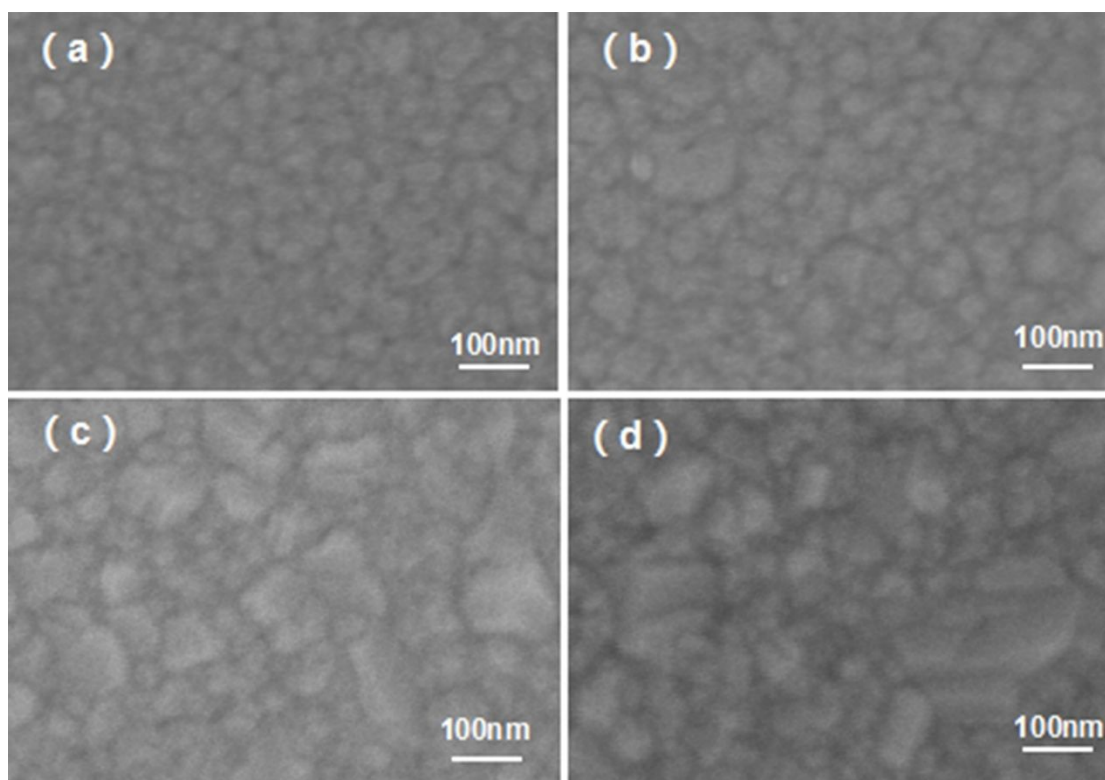


Figure S5. The morphologies of Ag films with the thickness of 30 nm (a), 50 nm (b), 70 nm (c) and 100 nm (d).

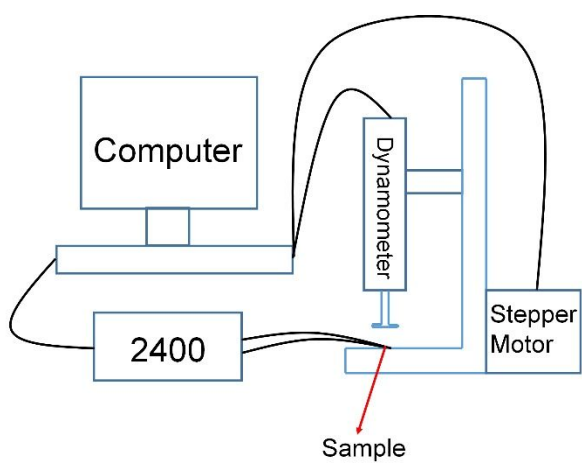
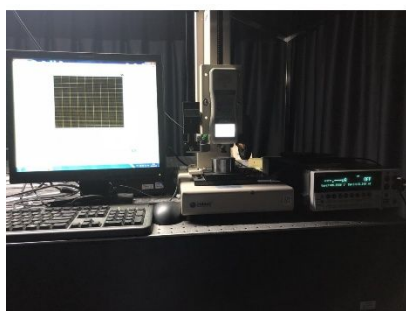


Figure S6. Pressure-sensing testing system

Table S1 Summary of piezo-resistive pressure sensors.

Structure	Sensitivity	Testing pressure	Response time	Detection limit
CNT-coated fabric/Ni-coated finger electrodes [1]	14.4 kPa ⁻¹	15 kPa	24 ms	2 Pa
SWNTs/ PDMS based [2]	1.8 kPa ⁻¹	1 kPa	<10 ms	0.6 Pa
Microstructured graphene arrays[3]	5.53 kPa ⁻¹	<100 Pa	0.2 ms	1.5 Pa
Mimosa-inspired micropattern[4]	50.17 kPa ⁻¹	10.4-780.3 Pa	<20 ms	10.4 Pa
Gold nanowire/tissue paper[5]	1.14 kPa ⁻¹	1.6 k	<17 ms	13 Pa
Microstrutured PDMS/ Glass or flexible substrate[6]	*851 kPa ⁻¹	20 kPa	0.15 ms	34 Pa
Microdome-Patterned PDMS[7]	15 kPa ⁻¹	<5 kPa	<100 ms	4 Pa
PEDOT:PSS/PUD[8]	56.8 kPa ⁻¹	6 kPa	200 ms	23 Pa
This work (Microstructured PDMS/Ag/rough PI/Au interdigital electrodes)	259.32 kPa ⁻¹	54 kPa	0.2 ms	0.36 Pa

* rigid substrate.

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