Supplementary Information

A flexible conformable artificial organ-damage memory system towards hazardous gas leakage based on one single organic transistor

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Table S1. Comparison with the reported response of the organic transistor-based NO_2 sensors.

Material	Response	Concentration	Pulse width	Ref.
Binuclear Phthalocyanine Dimer	21%	3 ppm	1 min	[1][1]
Pentacene	3000%	10 ppm	—	[2][2, 3]
TIPS-pentacene	800%	10 ppm	10 min	[3][4-10]
Ph5T2/CuPc	460%	10 ppm	> 10 min	[4]
PQTS12	229%	10 ppm	5 min	[5]
ZnPc	220%	10 ppm	> 10 min	[6]
NDI(2OD)(4tBuPh)-DTYM2	50%	10 ppm	< 1 min	[7]
p -6P/PTCDI-Ph/VoPc	500%	20 ppm	> 10 min	[8]
rGO/P3HT	100%	20 ppm	60 min	[9]
P3HT	270%	25 ppm	5 min	[10]
CuPc film	160000%	30 ppm	2 min	[11][11-18]
CuPc/Pentacene	400%	30 ppm	10 min	[12]
CuPc film	250%	30 ppm	5 min	[13]
CuPc/PTCDI-C8	120%	30 ppm	3 min	[14]
ZnPc	94%	30 ppm	10 min	[15]
Pentacene/DNA	50%	30 ppm	17 min	[16]
TES-ADT film	28%	30 ppm	20 s	[17]
Pentacene	22.7%	30 ppm	3 min	[18]
PCDTPT	**91.4%**	**20 ppm**	**1 min**	**Our work**
	230%	**20 ppm**	**2 min**	
	6877%	**20 ppm**	**10 min**	

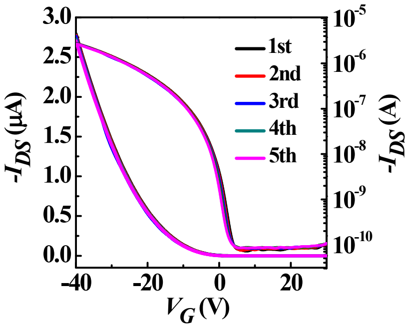

Fig. S1 Multi-measured transfer curves of the typical PCDTPT OFET in dry air.

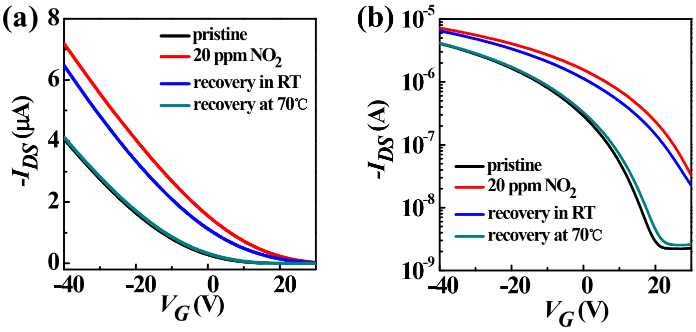

Fig. S2 Transfer curves of the typical PCDTPT OFET when tested under different conditions. (RT: room temperature)

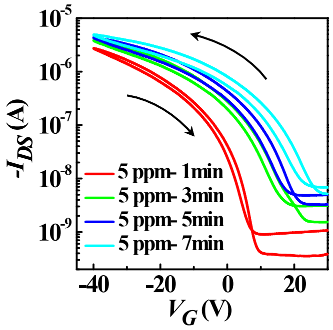

Fig. S3 Transfer curves of the typical PCDTPT OFET to 5 ppm NO_2 with different exposure time. (V_{DS} = -40 V)

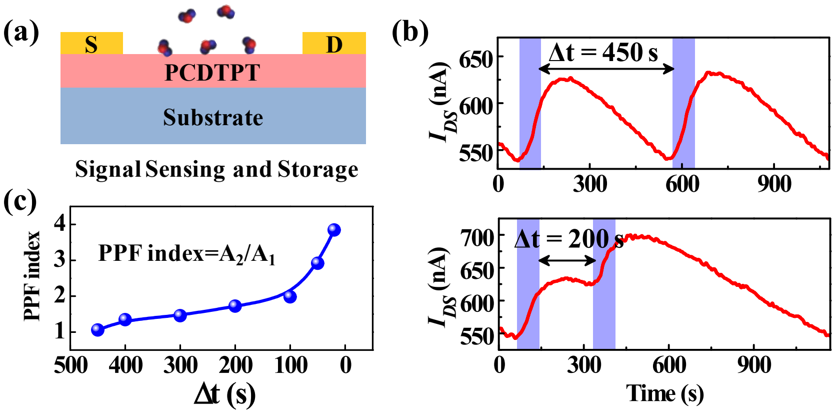

Fig. S4 (a) Schematic image of the artificial organ-damage memory system based on two-terminal PCDTPT device. (b) Real-time I_{DS} of two-terminal PCDTPT device to two successive 20 ppm NO_2 pulses at pulse interval Δt = 450 and 200 s, respectively. $\Delta\tau$ = 60 s. (c) PPF index of two-terminal PCDTPT device as a function of pulse interval.

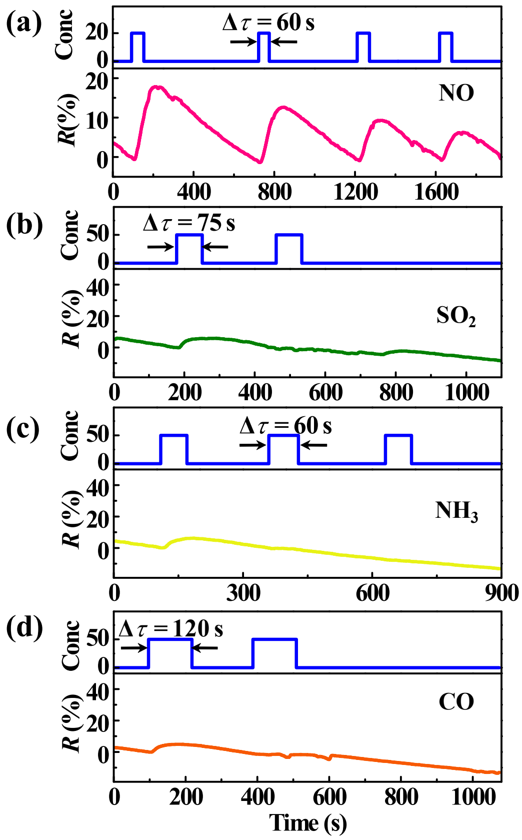

Fig. S5 Real-time response of PCDTPT OFET to (a) NO, (b) SO_2, (c) NH_3 and (d) CO.

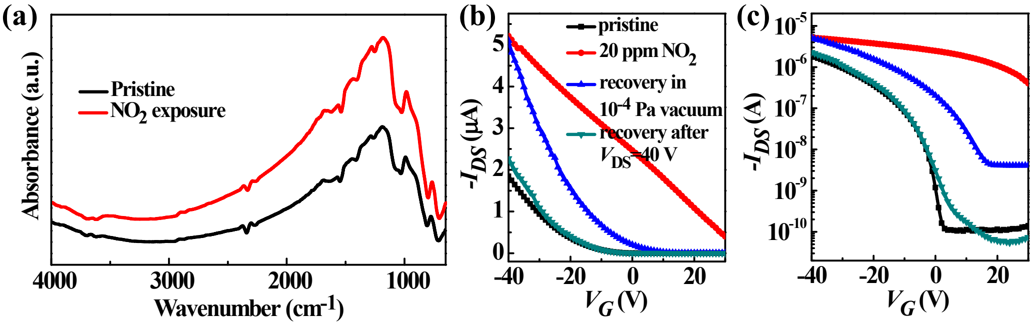

Fig. S6 (a) FT-IR of PCDTPT film before and after NO_2 exposure. (b, c) Transfer curves of the typical PCDTPT OFET when tested under different conditions.

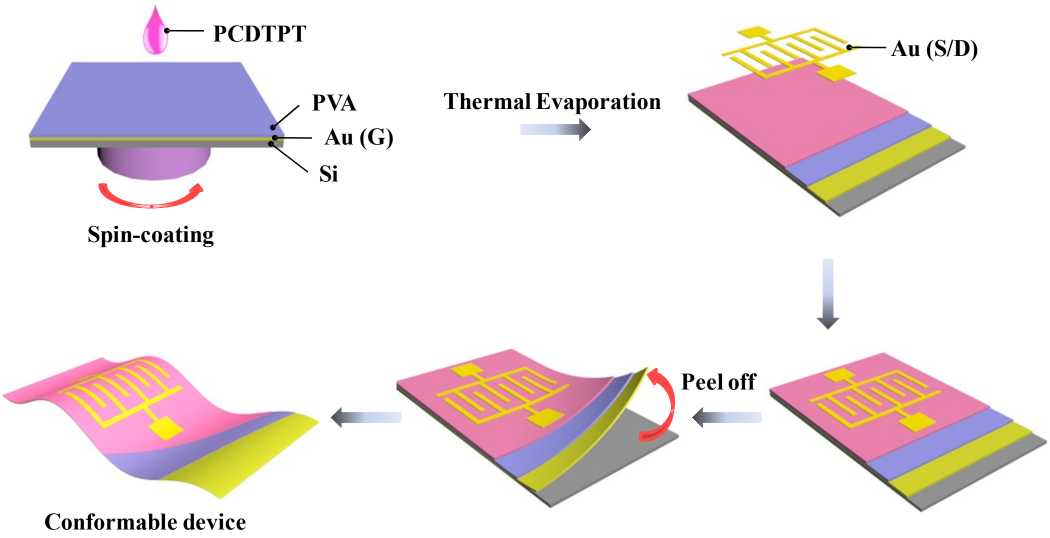

Fig. S7 Fabrication schematic of ultraflexible free-standing PCDTPT OFET with a top-contact bottom-gate device configuration.

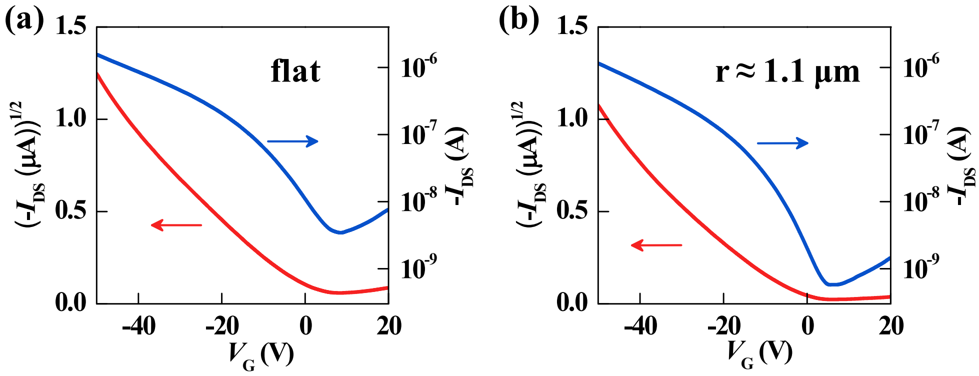

Fig. S8 Typical transfer charactristics of the ultraflexible PCDTPT device under a) flat state, b) bending state (r ≈ 1.1 μm). V_{DS} = -40 V.

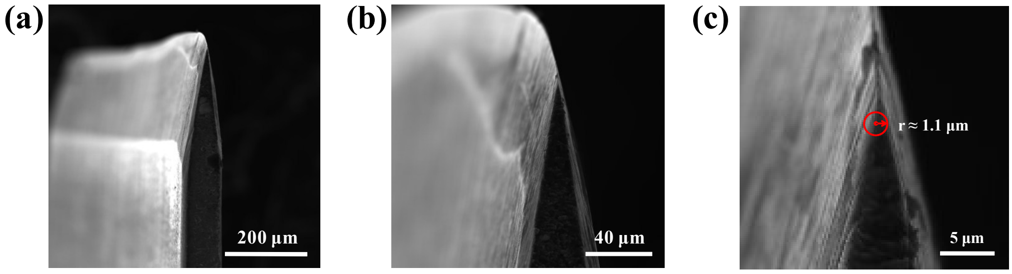

Fig. S9 SEM image of the sharp blade.

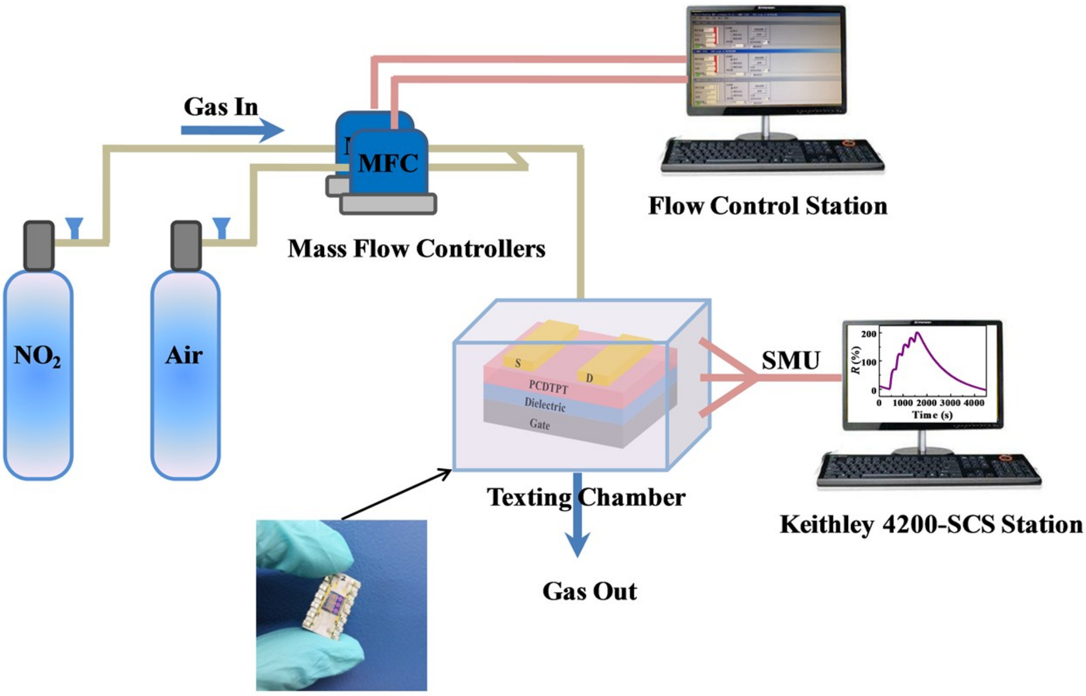

Fig. S10 Schematic image of the experimental setup used for the gas sensing.

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