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*Supplementary Materials*

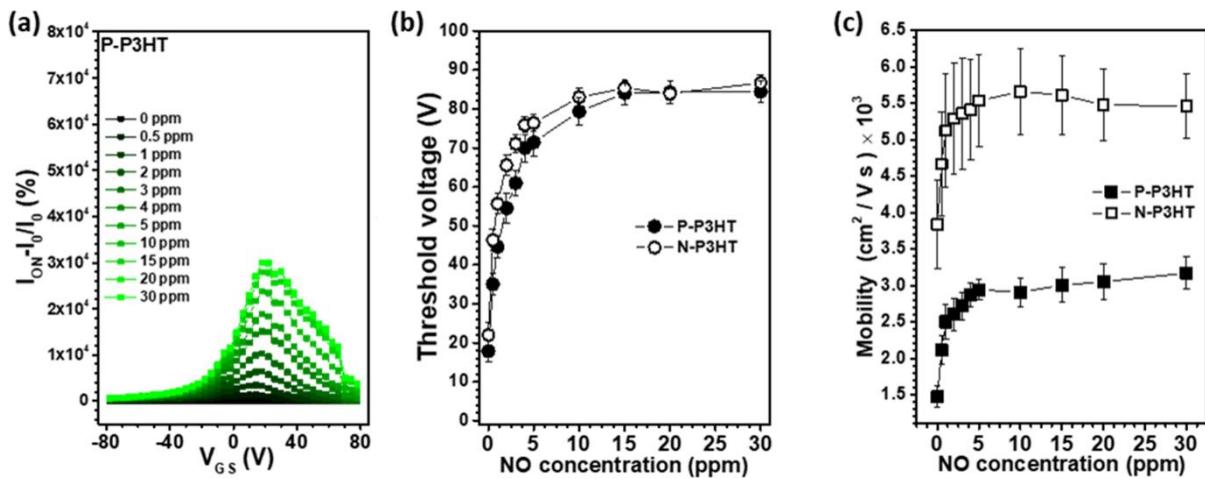
## High-performance nitric oxide gas sensors based on an ultrathin nanoporous poly(3-hexylthiophene) film

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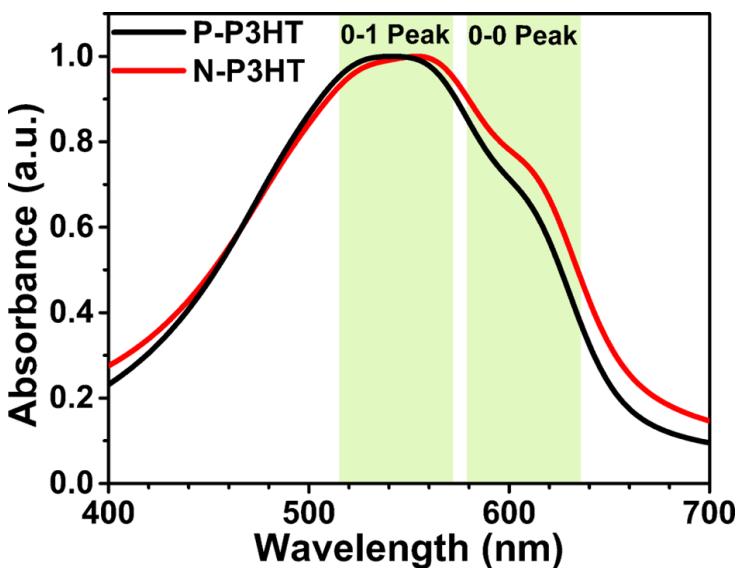
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**Figure S1.** (a) Current change ratio ( $(I_{ON} - I_0) / I_0$ ) over the gate voltage of the P-P3HT film. (b) Threshold voltage evolution of the corresponding P-P3HT-based and N-P3HT-based OFETs based on variations in the NO concentration. (c) Charge carrier mobility of the corresponding OFETs upon exposure to various NO gas concentrations.



**Figure S2.** Normalized UV-vis absorption spectra of the P-P3HT and N-P3HT films. The P-P3HT film was fabricated using the shear coating method, and the N-P3HT film was fabricated using the SAPS method. The shear speed was set at  $4 \text{ mm s}^{-1}$ .

**Table S1.** Electrical properties of the P-P3HT-based and N-P3HT-based OFET devices under various NO concentrations.

NO concentration (ppm)	P-P3HT	N-P3HT
Threshold voltage (V)	0 $18 \pm 2.7$	$22 \pm 3.1$
	0.5 $35 \pm 2.6$	$46 \pm 2.8$
	1 $44 \pm 2.8$	$55 \pm 2.6$
	2 $54 \pm 3.7$	$65 \pm 2.5$
	3 $60 \pm 3.3$	$71 \pm 2.2$
	4 $69 \pm 3.5$	$75 \pm 2.0$
	5 $71 \pm 3.6$	$76 \pm 2.3$
	10 $79 \pm 3.4$	$83 \pm 2.2$
	15 $84 \pm 2.9$	$85 \pm 2.0$
	20 $84 \pm 3.0$	$83 \pm 1.7$
Charge carrier mobility ( $\text{cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ )	30 $84 \pm 2.7$	$86 \pm 2.0$
	0 $(1.47 \pm 0.15) \times 10^{-3}$	$(3.84 \pm 0.61) \times 10^{-3}$
	0.5 $(2.11 \pm 0.20) \times 10^{-3}$	$(4.67 \pm 0.72) \times 10^{-3}$
	1 $(2.50 \pm 0.23) \times 10^{-3}$	$(5.12 \pm 0.77) \times 10^{-3}$
	2 $(2.60 \pm 0.22) \times 10^{-3}$	$(5.29 \pm 0.76) \times 10^{-3}$
	3 $(2.72 \pm 0.18) \times 10^{-3}$	$(5.36 \pm 0.76) \times 10^{-3}$
	4 $(2.86 \pm 0.17) \times 10^{-3}$	$(5.42 \pm 0.69) \times 10^{-3}$
	5 $(2.94 \pm 0.14) \times 10^{-3}$	$(5.53 \pm 0.63) \times 10^{-3}$
	10 $(2.91 \pm 0.19) \times 10^{-3}$	$(5.66 \pm 0.60) \times 10^{-3}$
	15 $(3.00 \pm 0.24) \times 10^{-3}$	$(5.61 \pm 0.54) \times 10^{-3}$
20	$(3.05 \pm 0.25) \times 10^{-3}$	$(5.48 \pm 0.49) \times 10^{-3}$
	$(3.17 \pm 0.22) \times 10^{-3}$	$(5.46 \pm 0.45) \times 10^{-3}$

**Table S2.** Responsivity (%) and response/recovery times (min) of the P-P3HT-based and N-P3HT-based OFET NO sensors in relation to a 10 ppm NO gas concentration for repeated cycles (on/off intervals of 10 min;  $V_{DS} = -80$  V and  $V_{GS} = 20$  V).

	Cycle number	P-P3HT	N-P3HT
Responsivity (%)	1	37.9	60.7
	2	31.6	56.8
	3	27.8	54.5
	4	26.9	51.4
	5	25.7	51.0
Response time (min)	1	7.95	6.87
	2	8.03	6.68
	3	8.03	6.60
	4	7.93	6.60
	5	7.93	6.60
Recovery time (min)	1	8.12	7.95
	2	8.30	7.95
	3	8.38	7.95
	4	8.38	8.03
	5	8.30	8.12

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**Table S3.** Comparison of the gas sensing characteristics of various NO gas sensors.

Material Structure	NO [ppm]	R [%]	S [% ppm <sup>-1</sup> ]	LOD [ppm]	t <sub>res</sub> [min]	t <sub>rec</sub> [min]
N-P3HT OFET (This work)	10	54.9 ± 1.6	4.71	~0.5	6.67 ± 0.05	8.00 ± 0.03
TiO <sub>2</sub> / TSV structure Resistor [1]	4	16.7	~3	-	1.82	2.40
SnO <sub>2</sub> / Ni- NCG Resistor [2]	40	15	~1	-	15.0	18.3
PEDOT-PSS : TiO <sub>2</sub> Resistor [3]	250	96	~0.3	1	3.87	0.92
PCDTBT Resistor [4]	100	80.6	-	5	5.0	35.0

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## Reference

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