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Molecular Engineering for High-Performance Fullerene

Broadband Photodetector

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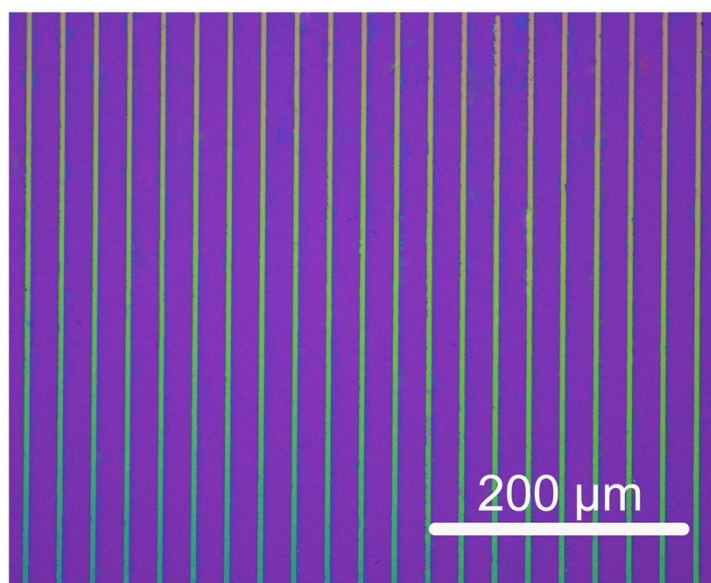


Figure S1 Optical image of large-scale microwire arrays of NiTPP-C₆₀.

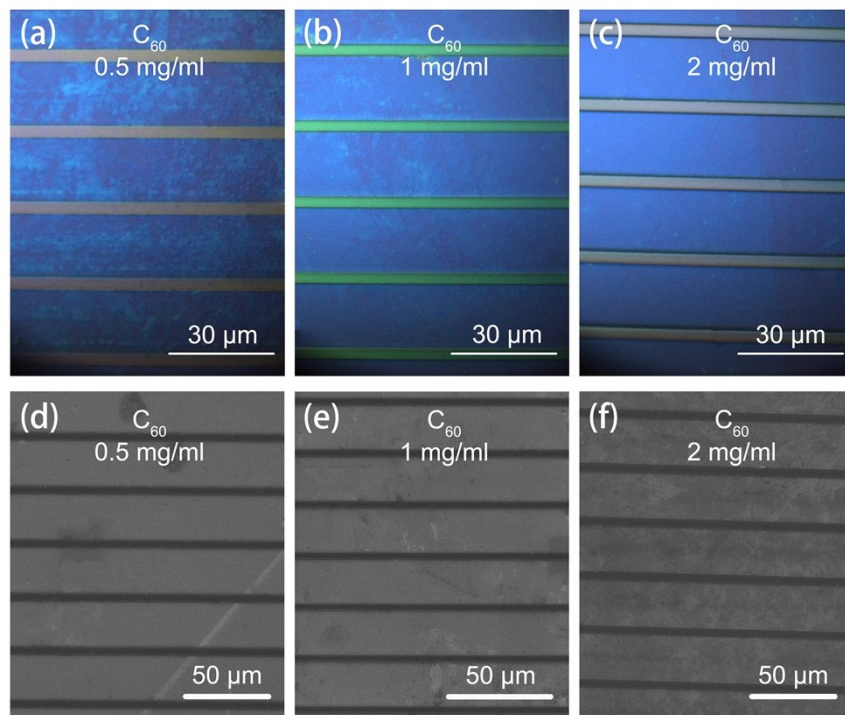


Figure S2 Optical images of (a) C_{60} (0.5 mg/ml), (b) C_{60} (1 mg/ml) and (c) C_{60} (2 mg/ml) microwire arrays. SEM images of (d) C_{60} (0.5 mg/ml), (e) C_{60} (1 mg/ml) and (f) C_{60} (2 mg/ml) microwire arrays.

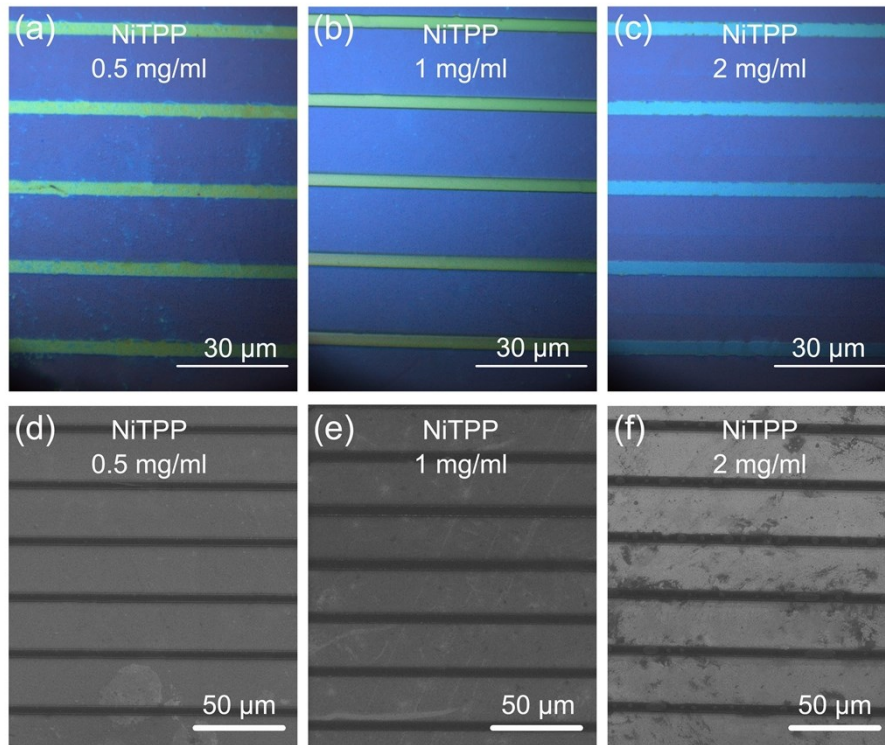


Figure S3 Optical images of (a) NiTPP (0.5 mg/ml), (b) NiTPP (1 mg/ml) and (c) NiTPP (2 mg/ml) microwire arrays. SEM images of (d) NiTPP (0.5 mg/ml), (e) NiTPP (1 mg/ml) and (f) NiTPP (2 mg/ml) microwire arrays.

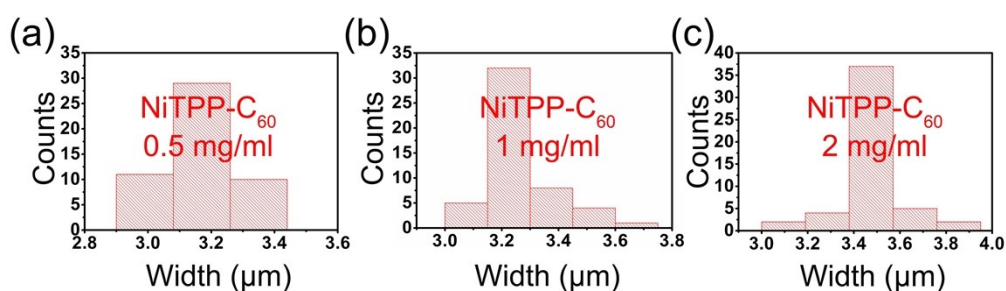


Figure S4 Width distribution of NiTPP-C₆₀ microwire arrays prepared at different concentrations, (a) 0.5 mg/ml, (b) 1 mg/ml, (c) 2 mg/ml.

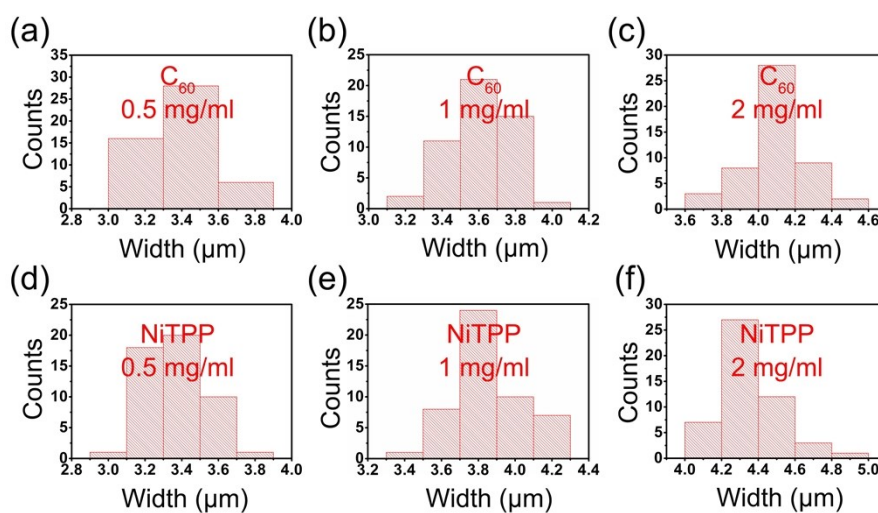


Figure S5 Width distribution of C₆₀ (a-c) and NiTPP (d-f) microwire arrays at different concentrations.

Table S1 Width statistics of C₆₀, NiTPP and NiTPP-C₆₀ microwires with different concentrations.

Concentration (mg/ml)	Width (μm)/C ₆₀			Width (μm)/NiTPP			Width (μm)/NiTPP-C ₆₀		
	min	max	ave	min	max	ave	min	max	ave
0.5	3.04	3.83	3.39	3.08	3.85	3.37	2.94	3.41	3.13
1	3.25	4.19	3.59	3.41	4.19	3.85	3.07	3.69	3.27
2	3.69	4.46	4.07	4.06	4.87	4.37	3.07	3.85	3.47

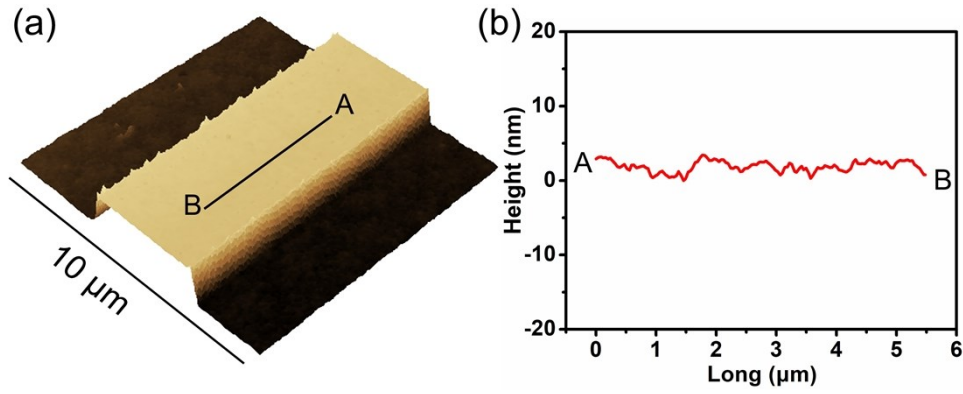


Figure S6 (a) AFM image of NiTPP-C₆₀ microwire and (b) the corresponding longitudinal height distribution.

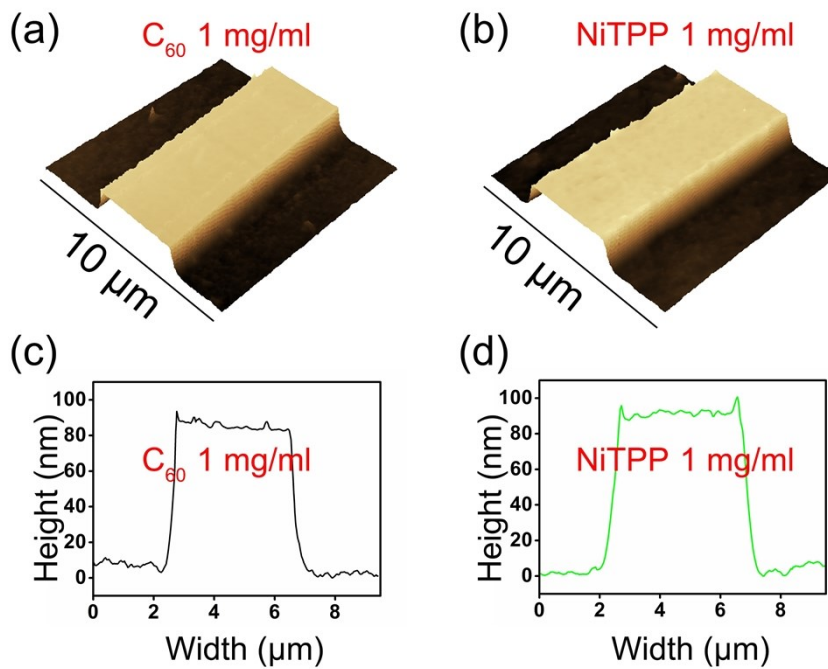


Figure S7 (a-b) AFM images of C₆₀ and NiTPP microwires. (c-d) Height distribution of C₆₀ and NiTPP microwires.

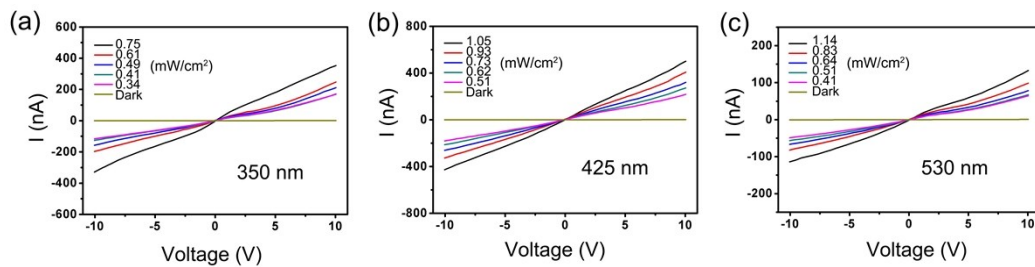


Figure S8 *I-V* curves of the NiTPP-C₆₀ microwires (1 mg/ml) device measured at room temperature in dark and under illumination with (a) 350 nm UV light, (b) 425 nm light and (c) 530 nm light.

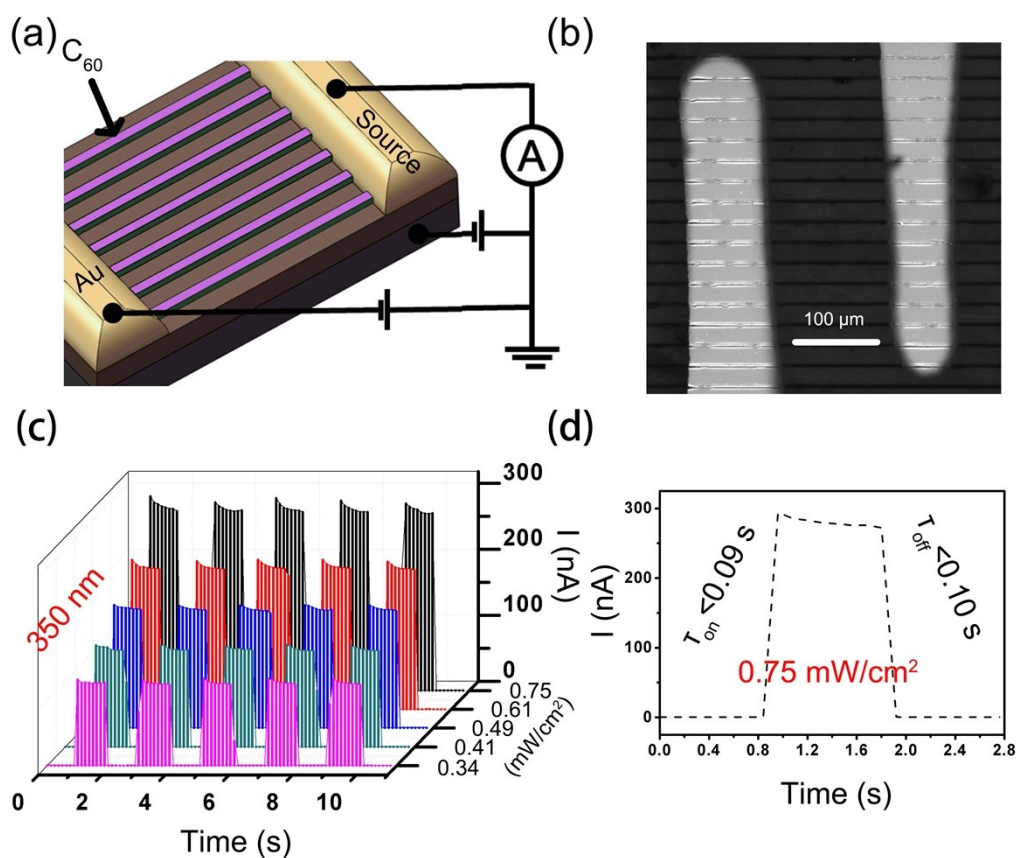


Figure S9 (a) Schematic diagram of the photodetector device based on microwire arrays grown from 1 mg/ml C_{60} , (b) SEM image of the corresponding device. (c) I - T curves of the photodetector measured at room temperature in dark and under illumination at 350 nm UV light and different optical power densities. (d) single-cycle optical response of the device at 350 nm UV light and 0.75 mW/cm² optical power density. The effective light-receiving area is for all photoelectric detection devices is 7.75×10^{-5} cm², and $V_{GS} = V_{DS} = 10$ V.

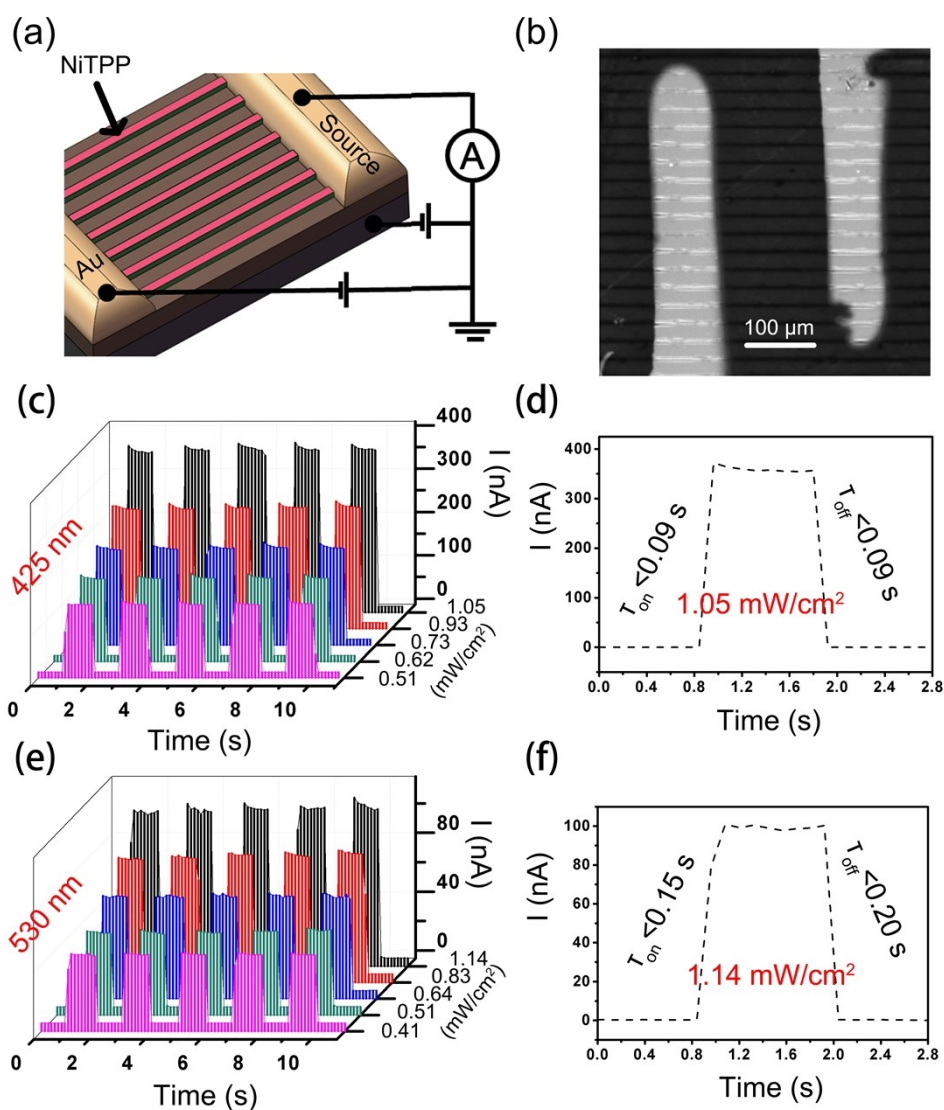


Figure S10 (a) Schematic diagram of the photodetector device based on microwire arrays grown from 1 mg/mL NiTPP, (b) SEM image of the corresponding device. (c, e) I - T curves of the NiTPP (1 mg/ml) microwires measured at room temperature in dark and under different light irradiation. (d, f) Single-cycle optical response of the device at 425 nm and 530 nm, where the optical power density is 1.05 and 1.14 mW/cm^2 , respectively. The effective light-receiving area for all photoelectric detection devices is $8.62 \times 10^{-5} \text{ cm}^2$, and $V_{\text{GS}} = V_{\text{DS}} = 10 \text{ V}$.

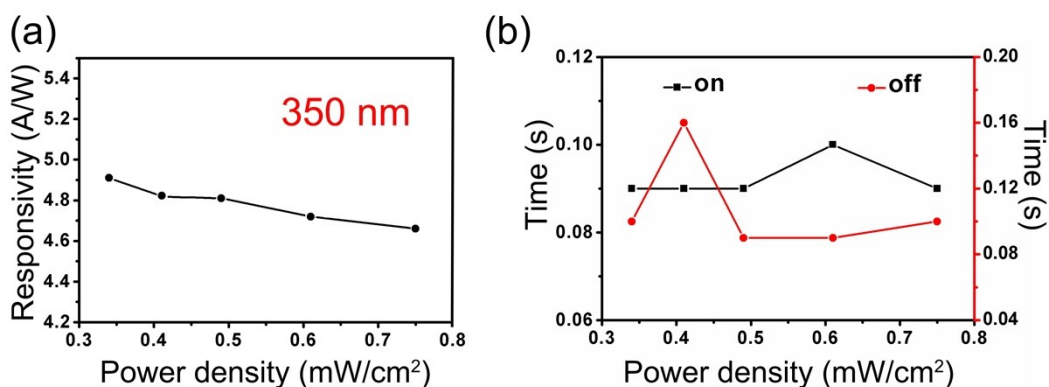


Figure S11 Responsivity of (a) C₆₀ (1 mg/ml) microwires at 350 nm UV light under different optical power densities. Rise and decay time of (b) C₆₀ (1 mg/ml) microwires at 350 nm UV light under different optical power densities.

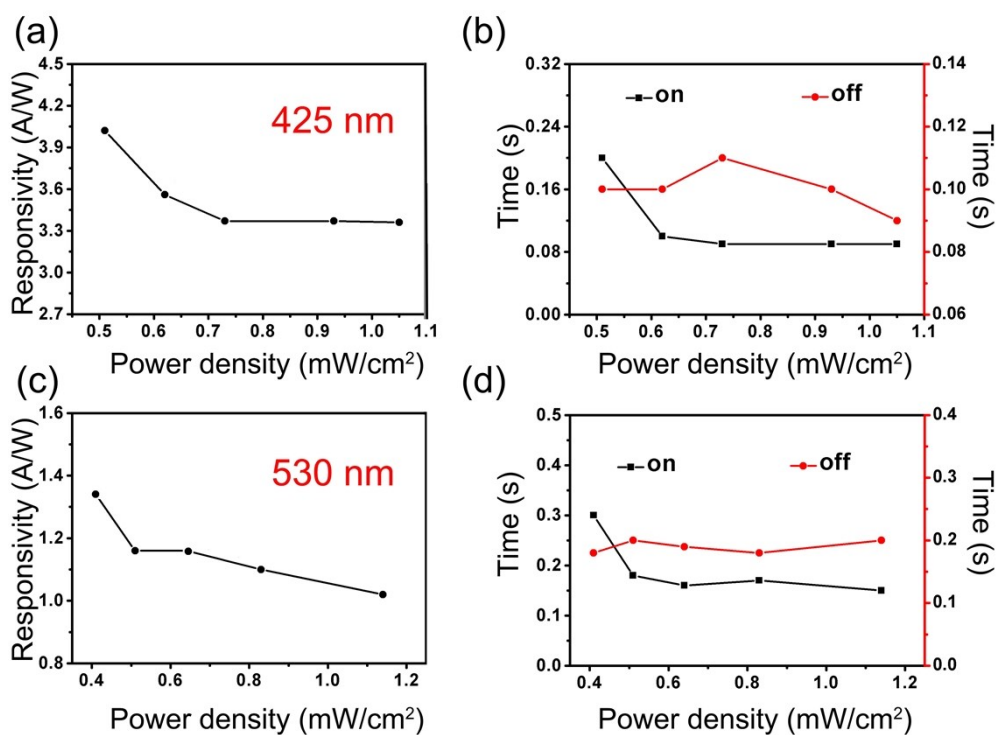


Figure S12 Responsivity of NiTPP microwires (1 mg/ml) (a) at 425 nm light and (c) at 530 nm light under different optical power densities. Rise and decay time of NiTPP microwires (1 mg/ml) (b) at 425 nm and (d) at 530 nm light under different optical power densities.