

ZnO nanoparticles UV detector on fabric substrate with high anti-twist performance by pretreated with Prussian blue

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Preparation of ZnO/PVDF flexible photodetector based on fabric substrate

A thin layer of PVDF was used to coat the ZnO film on the fabric substrate. First, 0.01 g of the prepared ZnO nanoparticles were dispersed in 2 mL of deionized water, with 100 μ L of ethylene glycol added as a film-forming agent. After uniformly ultrasonic dispersion, the solution was evenly coated onto the fabric substrate. Upon drying in an oven at 60°C, a thin layer of PVDF was applied to the device. And a flexible ZnO/PVDF fabric substrate photodetector was obtained.

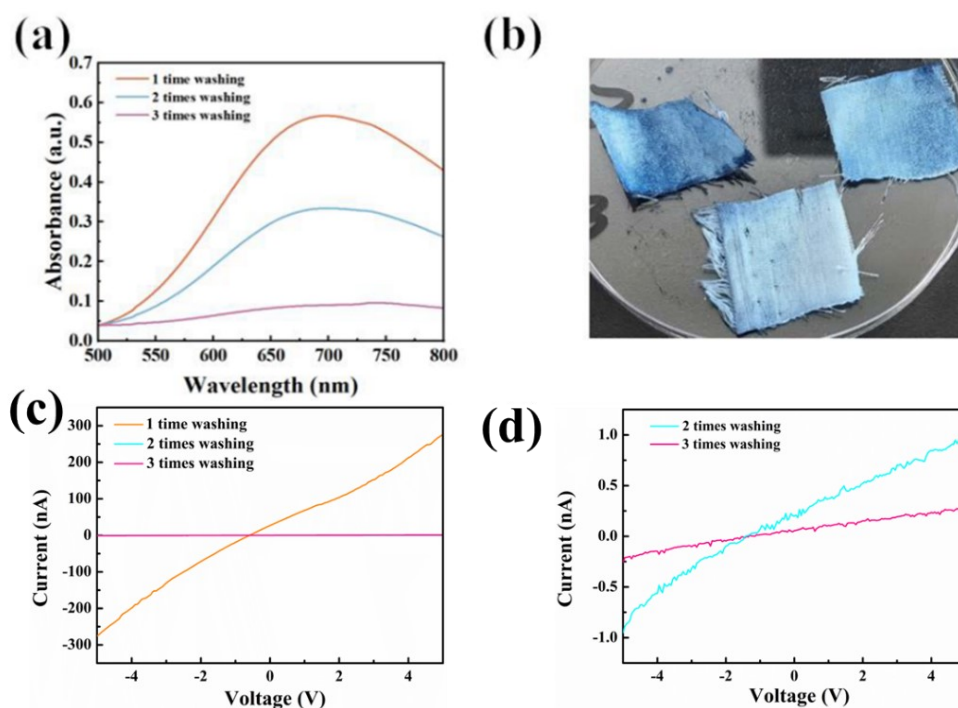


Fig. S1 (a) Ultraviolet-visible absorption spectra of fabrics grown in Prussian blue after different washes. (b) Optical photographs of fabrics grown in Prussian blue washed at different times. (c) and (d) I-V curves of fabrics substrate after different washes.

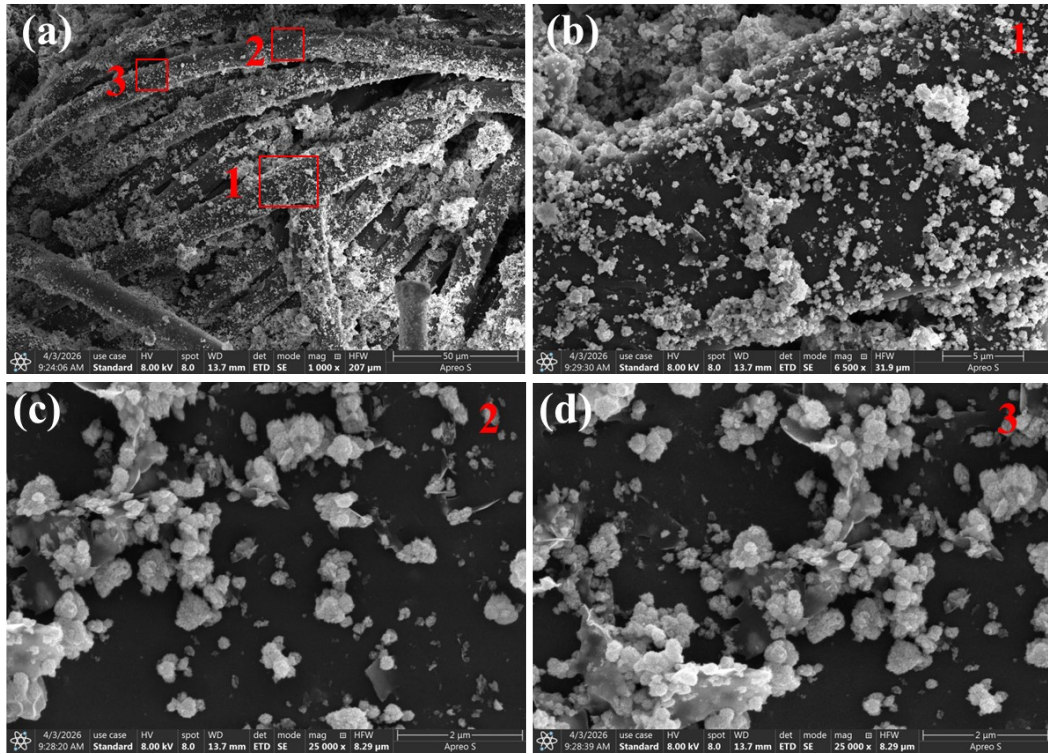


Fig. S2 SEM images of ZnO NP on fabric substrates. (a) low-resolution SEM image, (b)-(d) high-resolution SEM images corresponding to region 1-3 in (a).

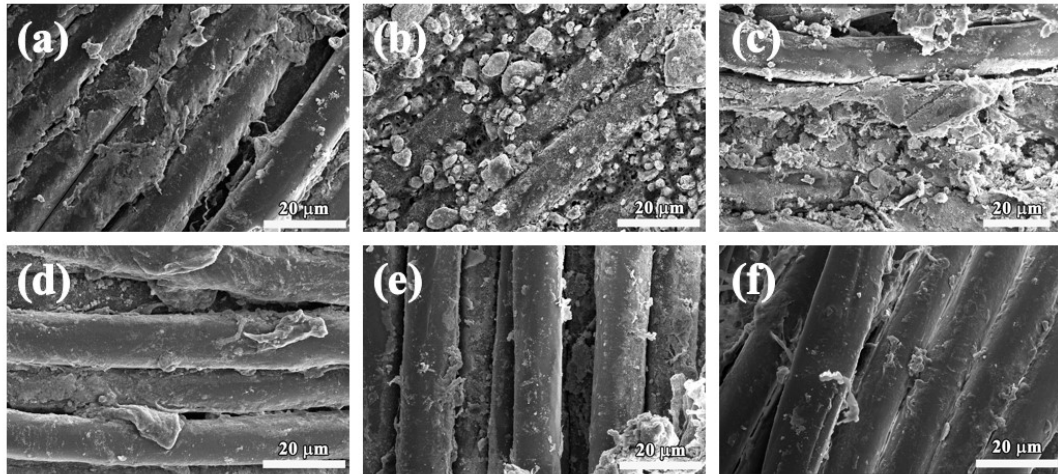


Fig. S3 SEM images of ZnO/PVDF fabric substrates after twisting them for different times. (a) Undistorted, (b) distorted 100 times, (c) distorted 200 times, (d) distorted 300 times, (e) distorted 600 times, (f) distorted 900 times.

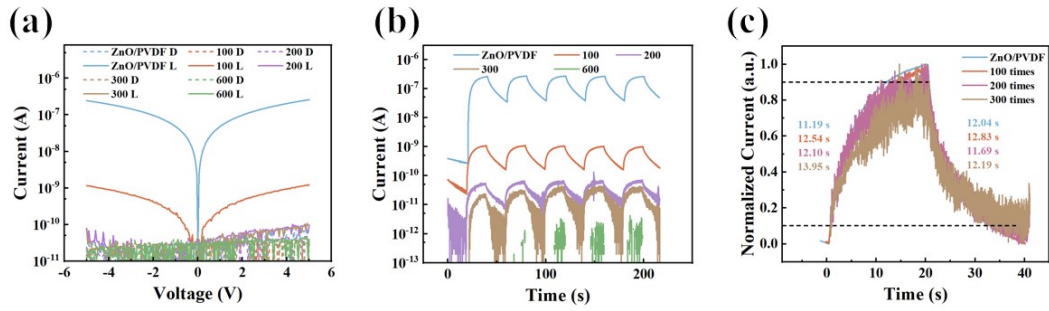


Fig. S4 (a) I-V curves of ZnO/PVDF on fabric substrates twisted at different times. (b) I-t curves of ZnO/PVDF twisted at different times under 365 nm illumination and 5 V bias voltage. (c) Response time of ZnO/PVDF devices with different distortion times.

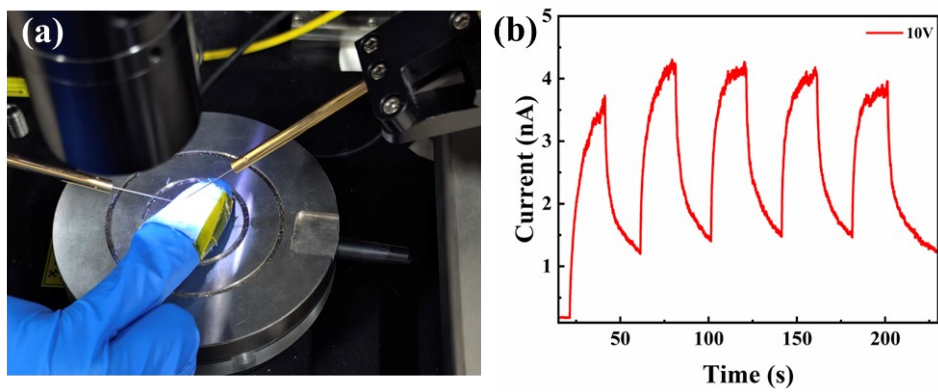


Fig. S5 (a) Photograph of the flexible ZnO/PB device to representative skin locations (back of the hand) of a volunteer, (b) the corresponding I-t curve of the ZnO/PB device at 10 V bias and under 365 nm illumination.

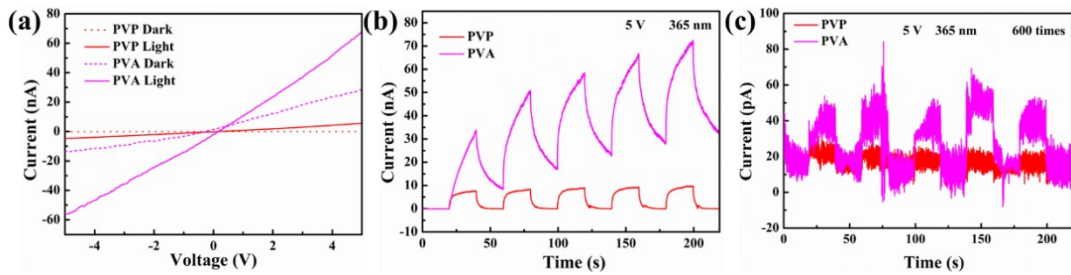


Fig. S6 (a) I-V curves, (b) I-t curves and (c) I-t curves after bending 600 times of the devices with PVP and PVA as binder.