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Supporting Information

Self-powered solar-blind UV/visual dual-band photodetection based on a solid-state PEDOT:PSS/α-Ga_2O_3 nanorod array/FTO photodetector

Ming-Ming Fan,*[a] Kang-Li Xu[a], Xiu-Yan Li,[a] Gao-Hang He,*[b] and Ling Cao,*[a]

[a] College of Physics and Optoelectronics, Taiyuan University of Technology, Taiyuan 030024, China.

[b] Vacuum Interconnected Nanotech Workstation (Nano-X), Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO), Chinese Academy of Sciences (CAS), Suzhou 215123, China.

* Corresponding Author:
fanmingming08@163.com; caoling@tyut.edu.cn; ghhe2018@sinano.ac.cn.

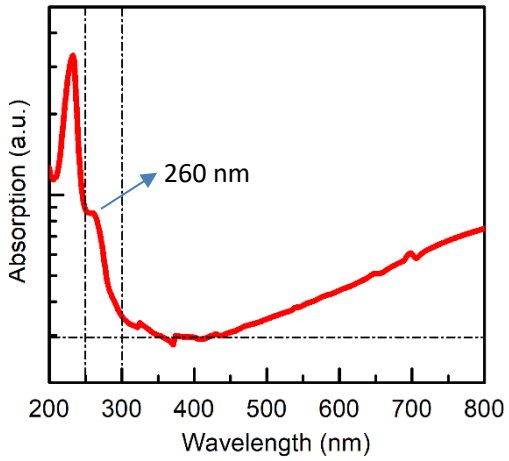

Fig. S1. Absorption of PEDOT:PSS film on glass in logarithmic scale.

The same processes in the article were employed to fabricate PEDOT:PSS film on glass. The absorption spectrum was investigated by a double-beam UV-vis spectrophotometer. Glass substrate was selected as the background. Thus, the absorption of PEDOT:PSS film can be evaluated with the elimination of the absorption of glass substrate.

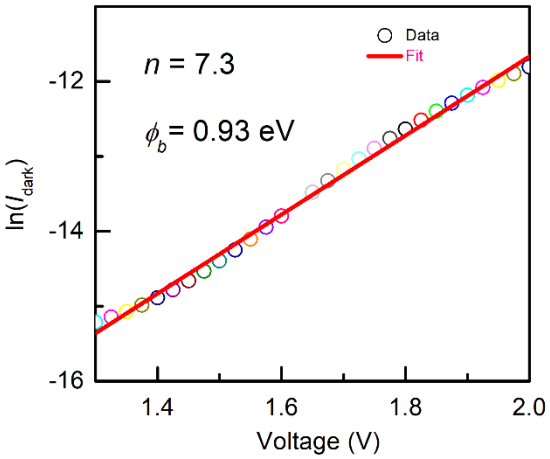

Fig. S2. Plot and linear fit of ln(I_{dark}) as a function of voltage.

For thermionic emission and $V>3kT/q$, the *I-V* characteristic of PEDOT:PSS/α-Ga_2O_3 Schottky junction is fitted by the following equations:[1]

$$I_{dark} = I_0 \exp(qV/nkT) \quad (1)$$

$$I_0 = SA^*T^2 \exp(-\phi_b/kT) \quad (2)$$

$$\ln(I_{dark}) = \ln(I_0) + qV/nkT \quad (3)$$

where I_0 is the saturation current, S is the contact area, A^* is the effective Richardson coefficient, q is the electron charge, ϕ_b is the barrier height, k is the Boltzmann constant, T is the absolute temperature, and n is the ideality factor. As shown in equation (3), n and ϕ_b can be evaluated by the slop and the intercept according to the plot of ln(I_{dark}) *vs* V, respectively. A^* is assumed to be 33 A cm^{-2} K^{-2} by taking the

electron effective mass of 0.276 m_0.[2] S is about 0.25 cm^2. Therefore, n and ϕ_b can be roughly estimated to be ~7.3 and ~0.93 eV, respectively.

References:

1. R. Suzuki, S. Nakagomi, Y. Kokubun, N. Arai and S. Ohira, *Appl. Phys. Lett.*, 2009, **94**, 222102.
2. H. He, R. Orlando, M. A. Blanco, R. Pandey, E. Amzallag, I. Baraille and M. Rérat, *Phys. Rev. B*, 2006, **74**, 195123.