Supporting Information

High Responsivity and High Rejection Ratio Self-Powered Solar-Blind Ultraviolet Photodetector Based on PEDOT:PSS/β-Ga₂O₃ Organic/Inorganic p-n Junction

Hebin Wang†#, Hongyu Chen#*, Li Li⊥, Yuefei Wang‡, Longxing Su†, Wanpeng Bian†, Bingsheng Li§, Xiaosheng Fang*∥

† Department of Physics, Harbin Institute of Technology, Harbin, 150001, P. R. China
‡ School of Life Science and Technology, Harbin Institute of Technology, Harbin 150080, P. R. China
§ Department of Physical Science and Technology, ShanghaiTech University, Shanghai, 201210, P. R. China
∥ Center for Advanced Optoelectronic Functional Materials Research, Key Laboratory of UV-Emitting Materials and Technology of Ministry of Education, Northeast Normal University, Changchun, 130024, P. R. China

# These authors contribute equally to this work.

Corresponding Author

Email: chenhy@hit.edu.cn
Email: libs@nenu.edu.cn
Email: xshfang@fudan.edu.cn
Figure S1. Schematic illustration of the growth process for the Ga$_2$O$_3$ microwires.

Figure S2. Scanning electron microscopy (SEM) image of as grown Ga$_2$O$_3$ microwires.
Figure S3. I-V curve of In-Ga$_2$O$_3$-In device in linear and logarithmic coordination.

Figure S4. I-V curve of In-PEDOT:PSS-In device in linear and logarithmic coordination.

Figure S5. I-V curve of PEDOT:PSS/Ga$_2$O$_3$ device in linear and logarithmic coordination.
Figure S6. Transmission electron microscopy (TEM) image and EDX mapping of Ga$_2$O$_3$ microwire.

Figure S7. Schematic diagram of our experimental setup for measuring the time response of the photodetectors.
**Figure S8.** Reproducible on/off switching of PEDOT:PSS/Ga$_2$O$_3$ photodetector upon 245 nm (0.88 μW cm$^{-2}$) light at 0 V, reproducible on/off switching of Ga$_2$O$_3$ photodetector upon 245 nm (0.88 μW cm$^{-2}$) light at 5 V.

**Figure S9.** Spectral response of the PEDOT:PSS/Ga$_2$O$_3$ p-n junction device at 0 V in logarithmic coordinate.