

**Electronic Supplementary Information for**

**Porous GaN/MoO<sub>3</sub> heterojunction for filter-free,  
ultra-narrowband ultraviolet photodetection**

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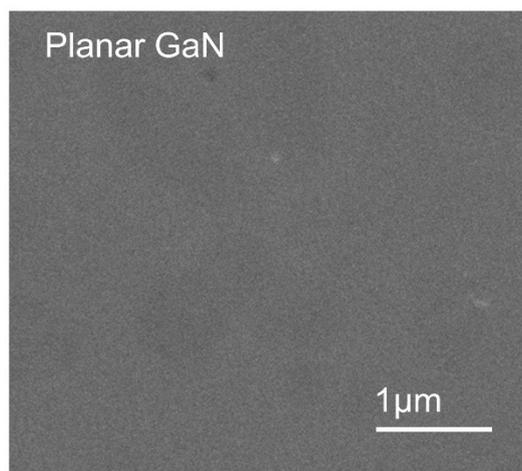


Figure S1. Surface SEM image of planar GaN.

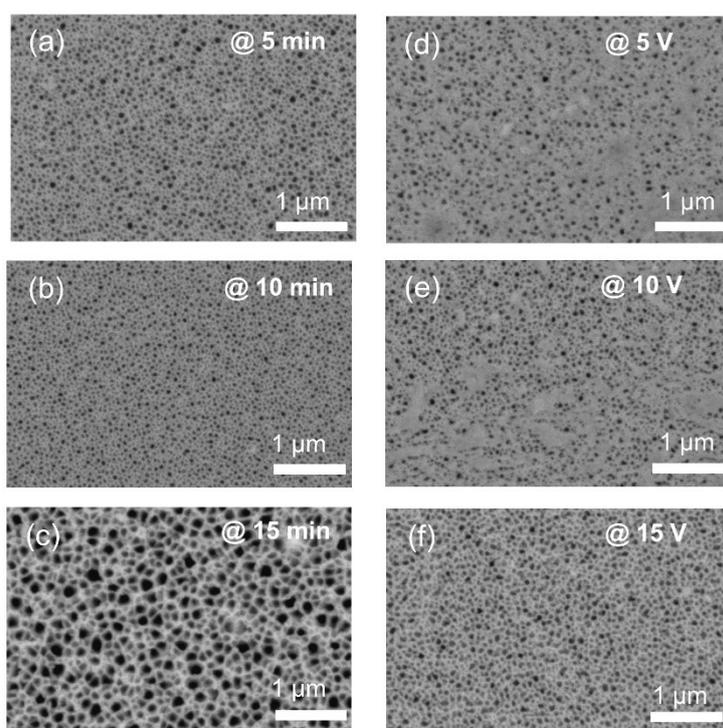


Figure S2. Surface SEM images of Po-GaN under different etching conditions. (a-c) Po-GaN etched under different etching times (5, 10 and 15 min) at a fixed bias of 15 V. (d-f) Po-GaN etched for 5 min under different etching voltages (5, 10 and 15 V).

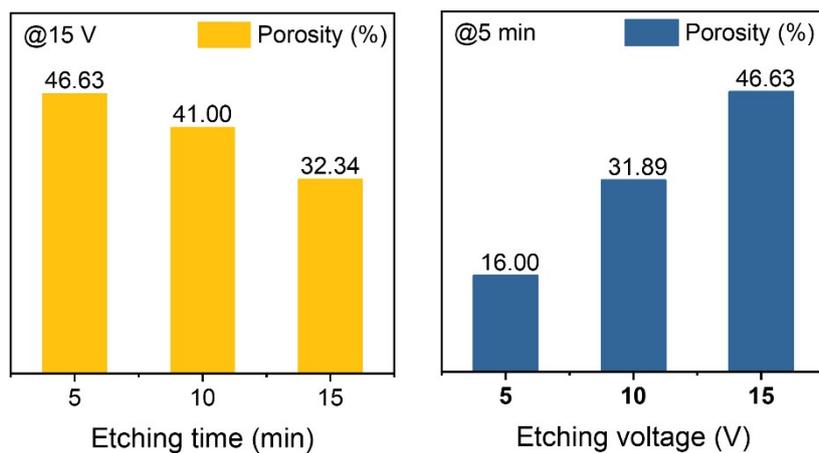


Figure S3. Etching (a) time and (b) voltage dependent porosity of Po-GaN.

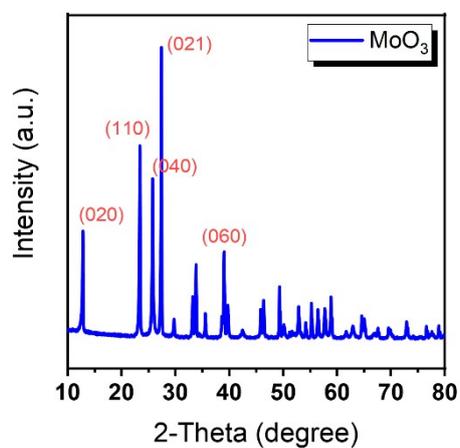


Figure S4. XRD patterns of the deposited MoO<sub>3</sub> film. The diffraction peaks at 12.8°, 25.7° and 39.0° are attributed to the (010) planes of the MoO<sub>3</sub> structure. The peaks at 23.3° and 27.4° can be assigned to the (110) and (021) planes.

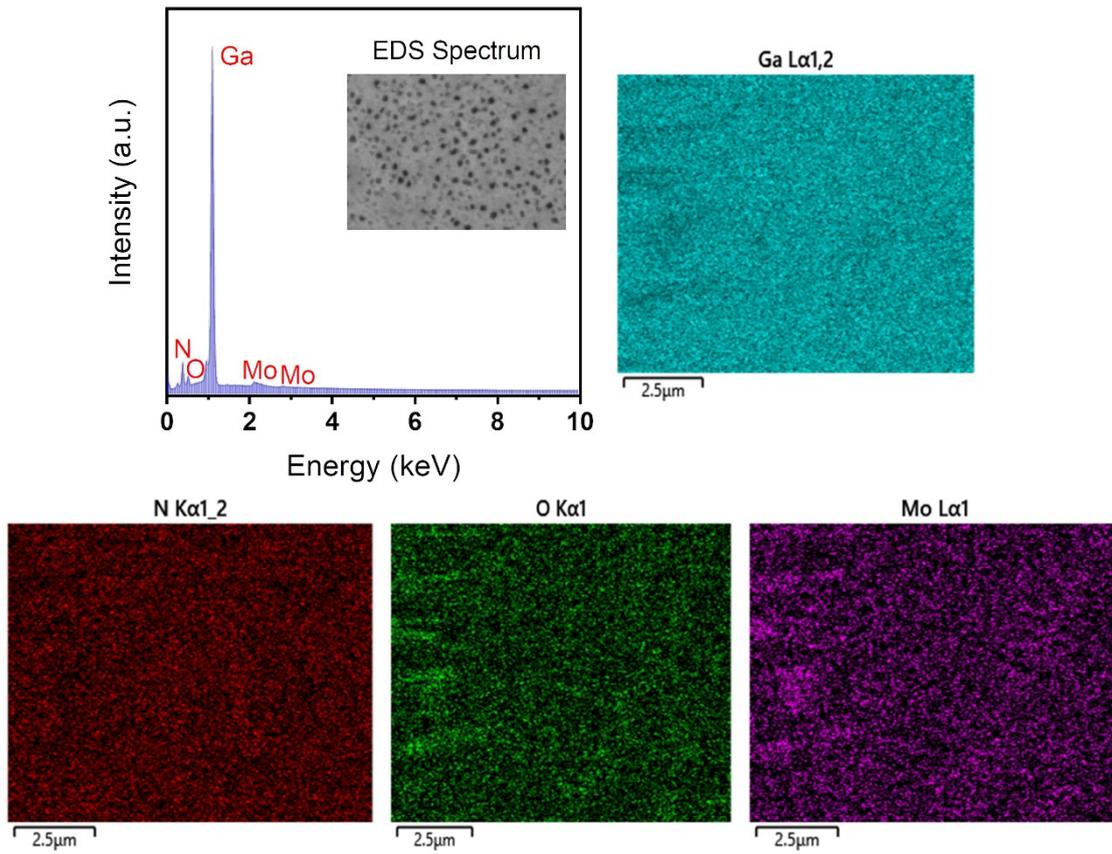


Figure S5. EDS analysis of the Po-GaN/MoO<sub>3</sub> heterojunction. The elements Ga, N, Mo, O are obviously observed.

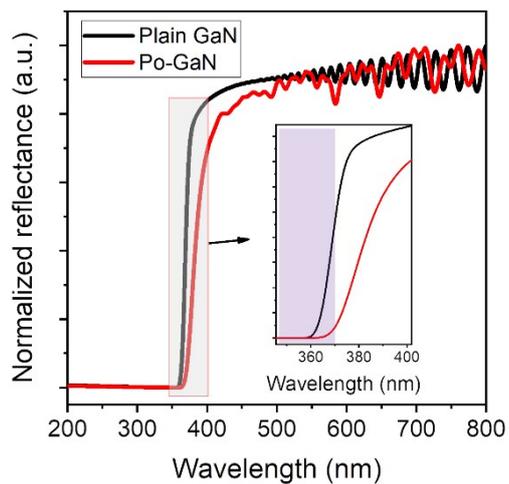


Figure S6. Normalized reflectance spectra of plain GaN and Po-GaN.

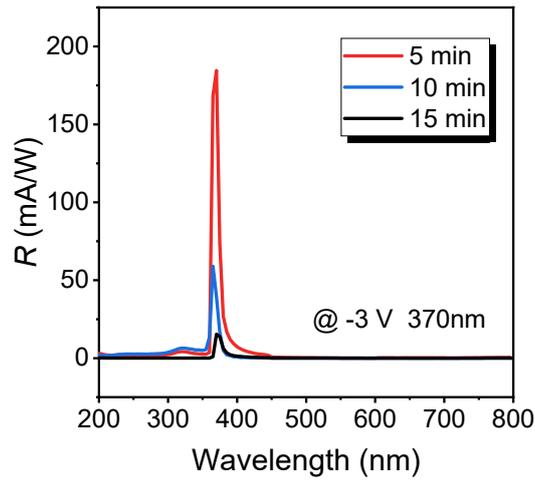


Figure S7. Etching times of Po-GaN dependent spectral response of the Po-GaN/MoO<sub>3</sub> PD.

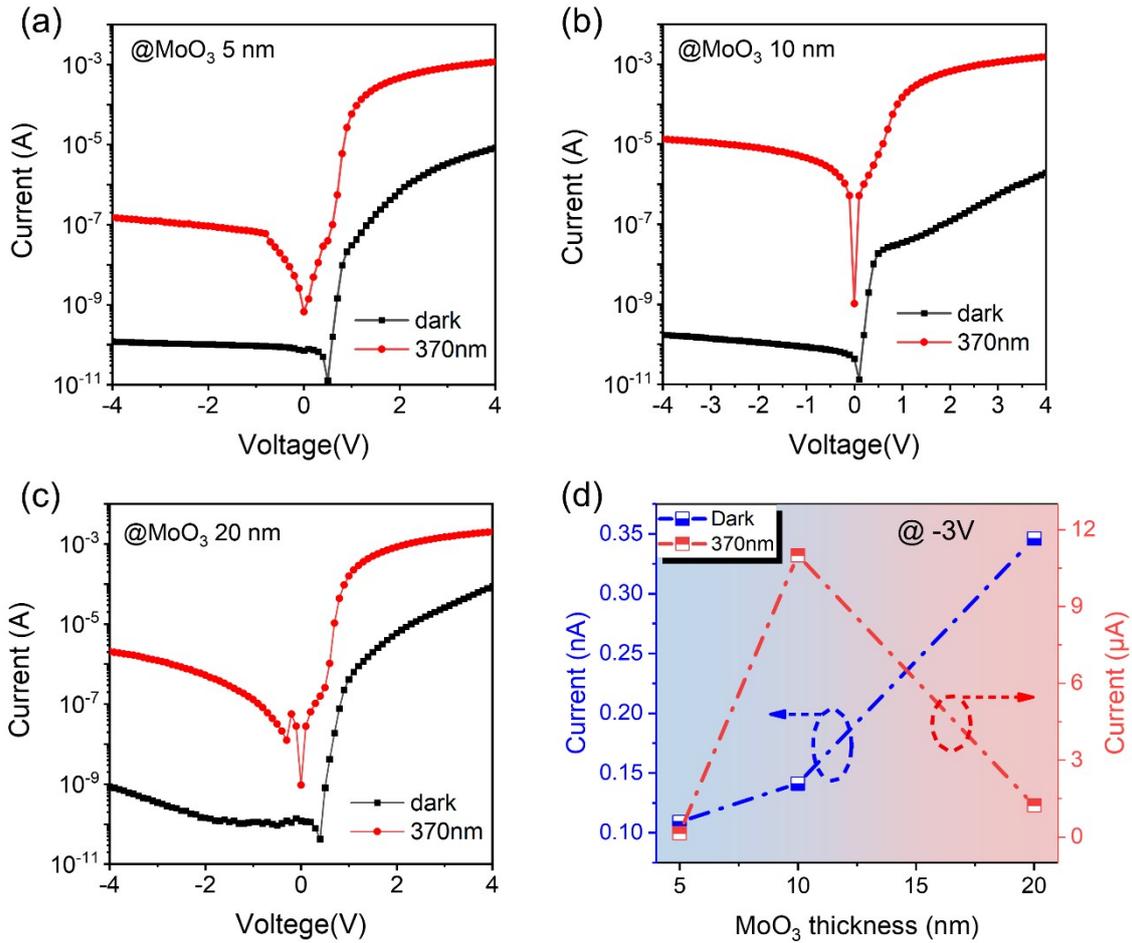


Figure S8. MoO<sub>3</sub> thickness dependent photoelectric properties of the Po-GaN/MoO<sub>3</sub> PDs. (a-c)  $I$ - $V$  characteristics under dark and UV illumination. (d) Photocurrent and dark current as a function of the MoO<sub>3</sub> thickness.

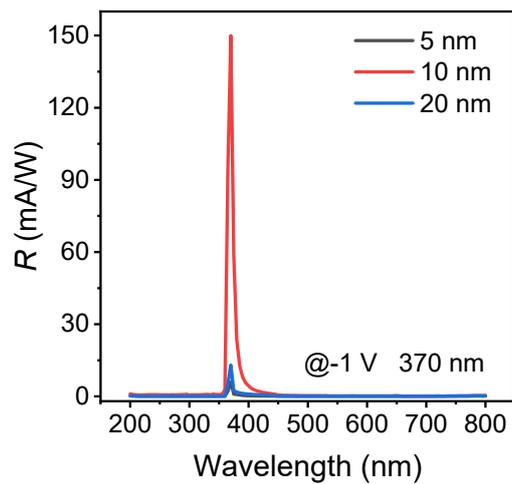


Figure S9. MoO<sub>3</sub> thickness dependent spectral response of the Po-GaN/MoO<sub>3</sub> PD.

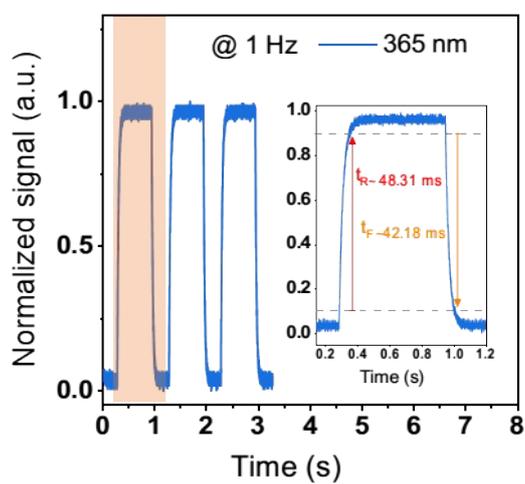


Figure S10. Typical pulse response of a Po-GaN/MoO<sub>3</sub> PD to a 365 nm LED. The inset shows a single pulse optical response extracted to evaluate the response speed.