

Supporting Information

Engineering GaN/AuNC core-shell nanowire heterojunction by gold nanoclusters with excitation-dependent behavior to enhance the responsivity and stability of self-driven photodetector

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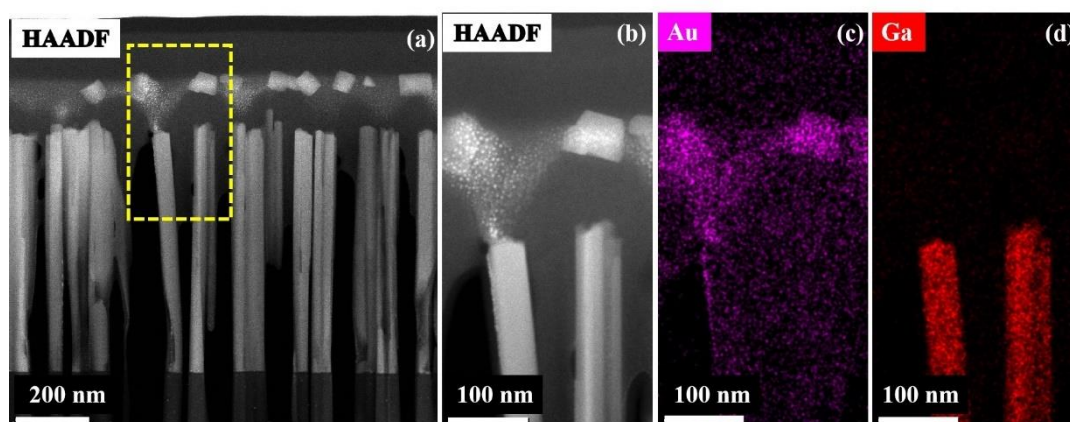


Figure S1. The scanning transmission electron microscope (STEM) images of GaN/AuNC hybrid NWs array with energy dispersive X-ray (EDX) mapping images (yellow dashed box).

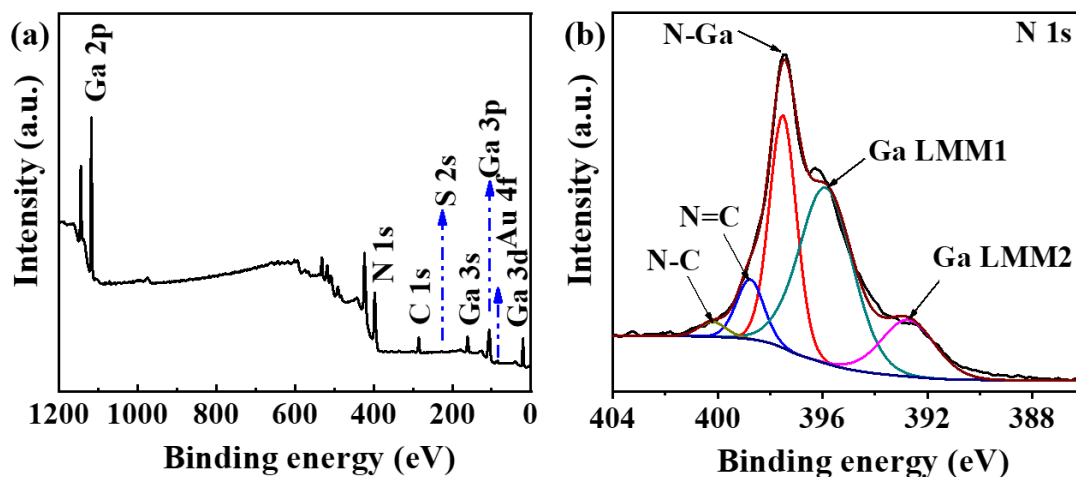


Figure S2. (a) Full spectrum of X-ray photoelectron spectroscopy (XPS) and (b) N 1s spectrum of GaN/AuNC hybrid nanowires (NWs).

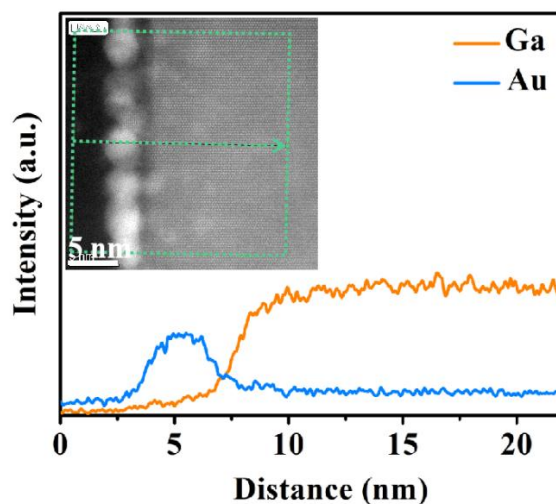


Figure S3. EDX scanning profiles of a single GaN/AuNC hybrid NW along the line displayed in the STEM image (inset). The inset corresponds to Figure 2c.

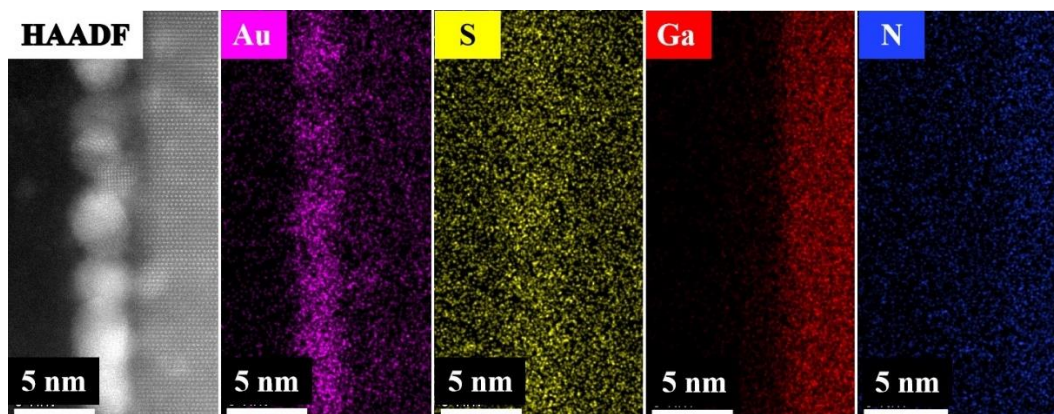


Figure S4. The STEM images of GaN/AuNC hybrid NW with EDX mapping images. Some images corresponds to Figure 2c and 2d, which are used for better comparison.

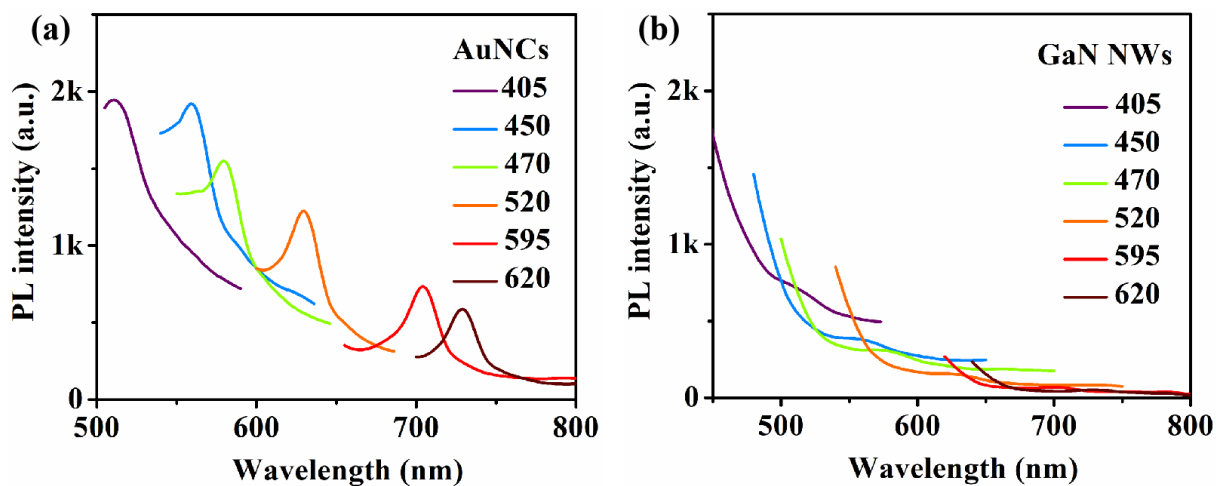


Figure S5. Photoluminescence (PL) spectra of (a) pure AuNCs on glass and (b) GaN NWs under different excitation wavelengths from 405 nm to 620 nm.

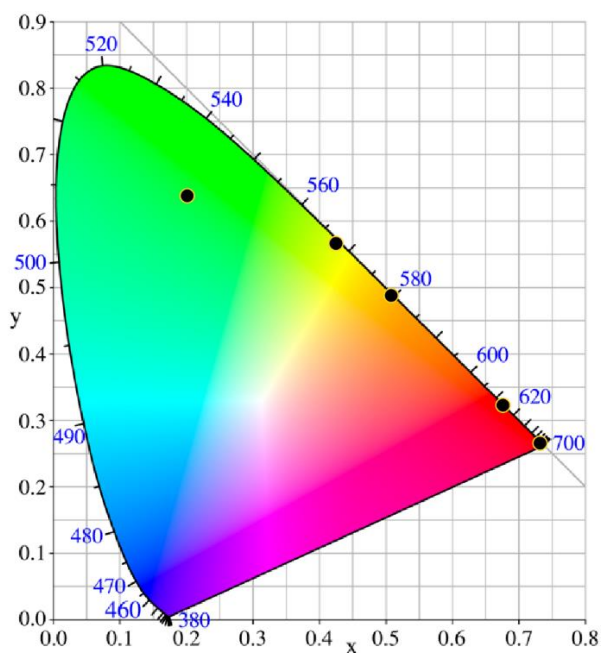


Figure S6. Tunable emission colors of GaN/AuNC hybrid NWs (black data points) plotted on Commission International de l'Eclairage (CIE) chromaticity coordinates under different excitation wavelengths from 405 nm to 620 nm.

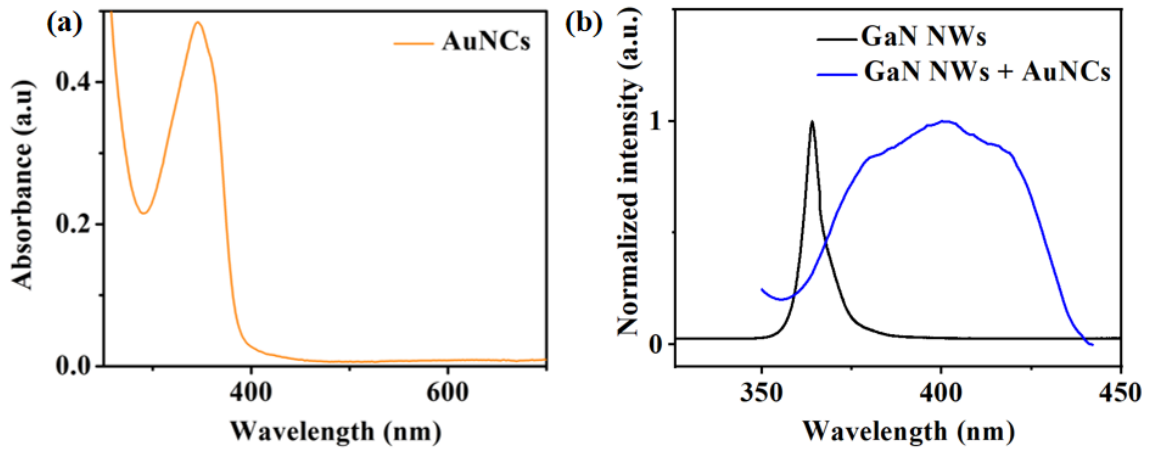


Figure S7. (a) UV-Vis absorption spectra of AuNCs in dimethyl sulfoxide (DMSO) solution. (b) The emission spectra of GaN with and without AuNCs under 310 nm illumination.

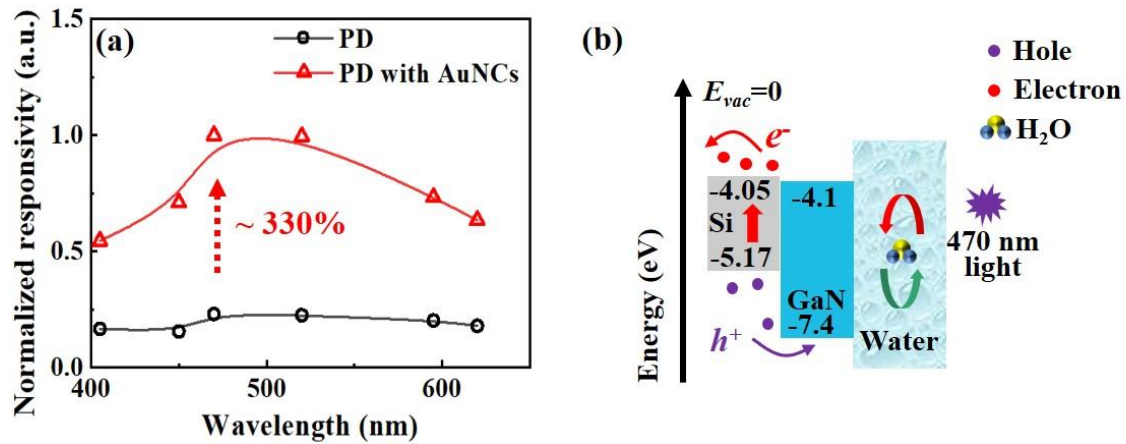


Figure S8. (a) Normalized responsivity of photodetectors (PDs) at different wavelengths. (b) The energy band diagram of the PD without AuNCs under 470 nm illumination.

Table S1. Comparison between metal nanocluster-based PDs and this work.

Materials	Wavelength (nm)	Bias voltage (V)	Reference
Au NCs/SiO ₂ /Si	635	60	S1
CdSe NPLs and Au ₂₅ NCs	Sunlight	2	S2
GSH-Au NCs/Graphene	325	0.1	S3
Au-QDs	405	0	S4
GaN NWs + AuNCs	310 - 620	0	This work

References

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