Supporting Information

Boosting photoelectrochemical performance on α-Ga_2O_3 nanowire arrays by indium cation doping for self-powered ultraviolet detection

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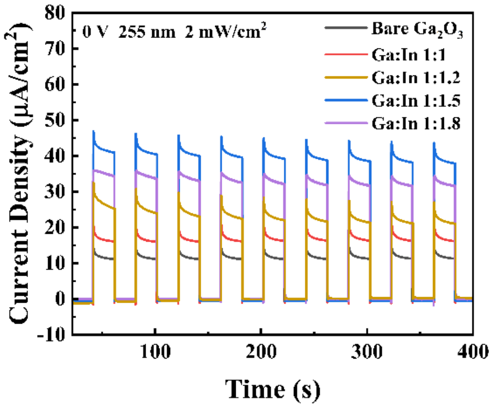

Fig. S1. (Color online) Current density−time curves of samples with different indium doping ratios.

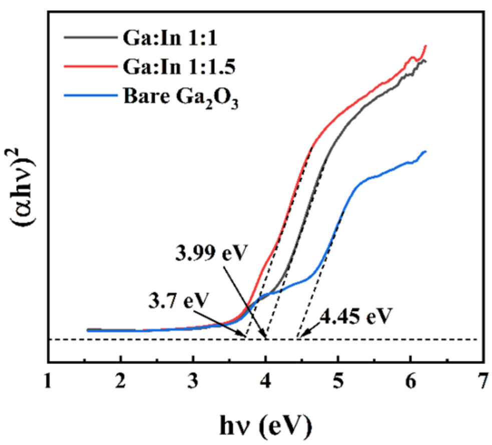

Fig. S2. (Color online) Tauc plots of the three sample groups.

The Tauc plot is used to determine the band gap energy (E_g) of a material by plotting the relationship between the absorption coefficient (α) and photon energy ($h\nu$). The band gap energy is typically determined by extrapolating the linear portion of the plot. The expression for the Tauc plot is:

$$(\alpha h\nu)^2 = A(h\nu - E_g) \tag{S1}$$

Where α is the absorption coefficient, h is Planck's constant, ν is the frequency of the incident light, E_g is the bandgap energy, and A is a constant.

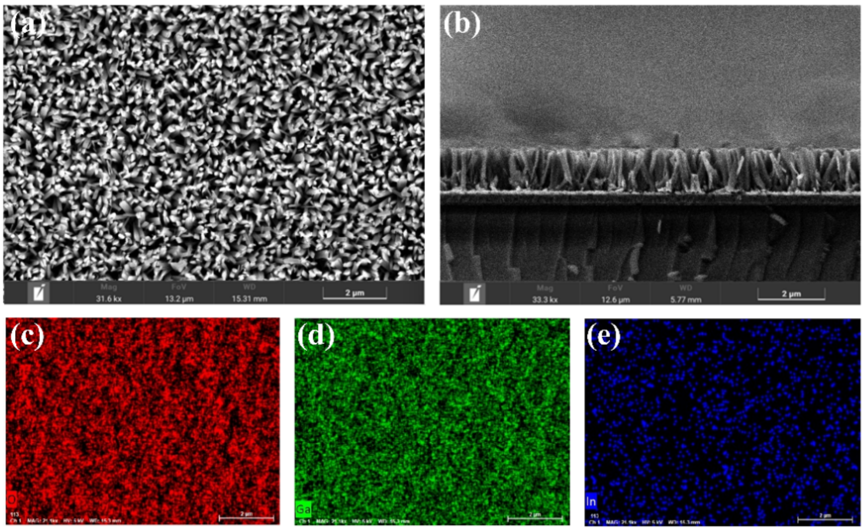

Fig. S3. (Color online) (a) Top-view scanning electron microscopy (SEM) image of indium-doped α-Ga_2O_3 samples. (b) Cross-sectional SEM image of indium-doped α-Ga_2O_3 samples. (c) Oxygen (O) elemental mapping of the indium-doped samples. (d) Gallium (Ga) elemental mapping of the indium-doped samples. (e) Indium (In) elemental mapping of the indium-doped samples.

Table S1. Performance Comparison of Ga_2O_3–based Ultraviolet Photodetectors from Previous Reports.

Structures	Type	Light condition	R(mA/W)	τ_{rise}/τ_{decay}(ms)	Ref
β-Ga_2O_3	PEC PD	254 nm	3.81	290/160	[1]
α-Ga_2O_3	PEC PD	254 nm	0.21	76/56	[2]
Al: α-Ga_2O_3	PEC PD	260 nm	1.46	421/139	[3]
α-Ga_2O_3/CFP	PEC PD	254 nm	12.9	150/130	[4]
α-Ga_2O_3-γ-Al_2O_3	PEC PD	254 nm	0.174	100/100	[5]
α-Ga_2O_3/Cu_2O QDs	PEC PD	254 nm	4.57	810/970	[6]
α-GaOOH/α-Ga_2O_3	PEC PD	250 nm	0.29	240/60	[7]
α-Ga_2O_3/ZnS	PEC PD	310 nm	12.9	59/18	[8]
SnO_2/α-Ga_2O_3	PEC PD	265 nm	5.94	17/18	[9]
α-Ga_2O_3/ZnO	PEC PD	254 nm	34.2	250/180	[10]
α-Ga_2O_3	PEC PD	255 nm	11.75	54/11	this work
In: α-Ga_2O_3	PEC PD	255 nm	38.85	13/8	this work

Reference

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