

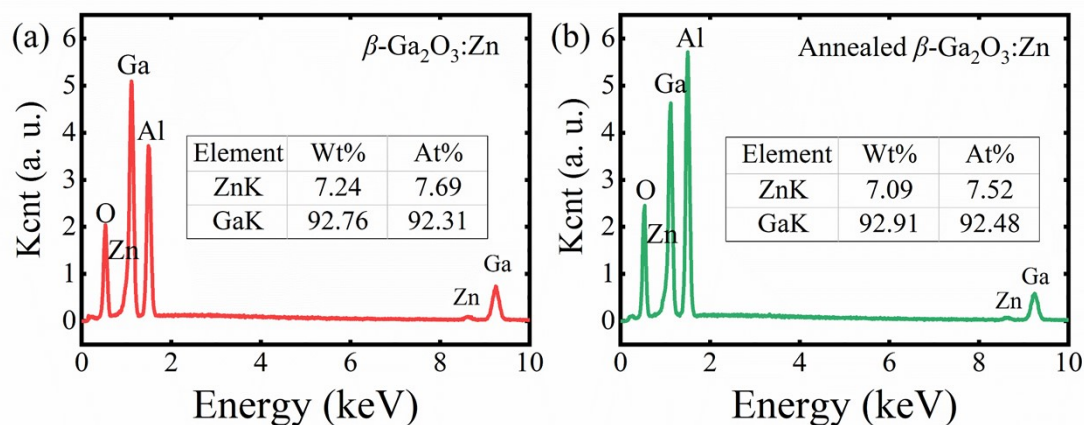
## Electronic Supplementary Information

### Structural and Optoelectronic Characteristics of $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Epitaxial Films with Zn Alloying and Subsequent Oxygen Annealing

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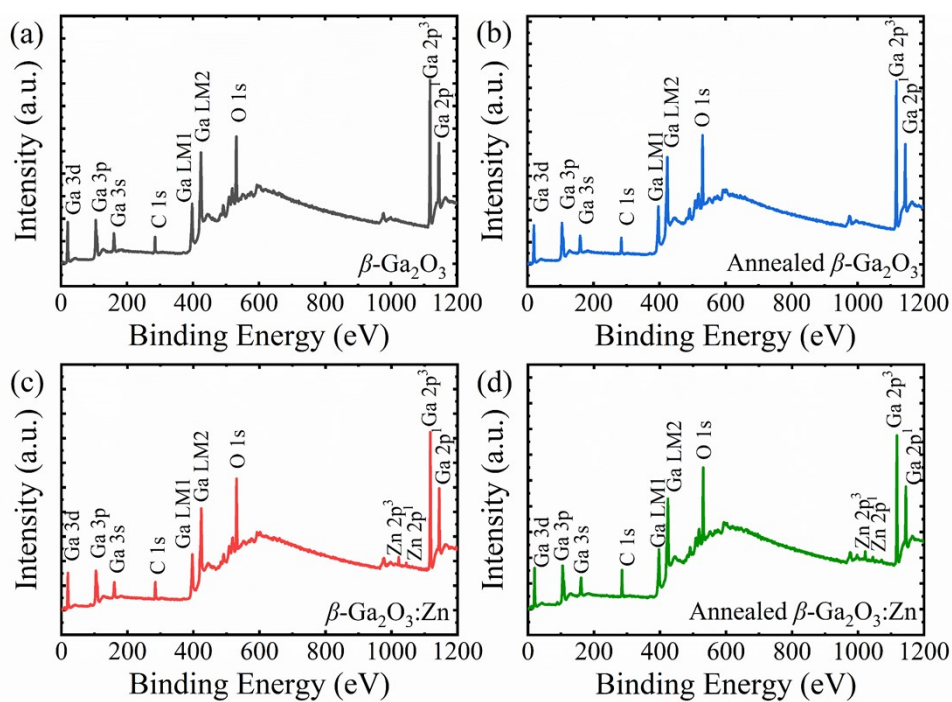
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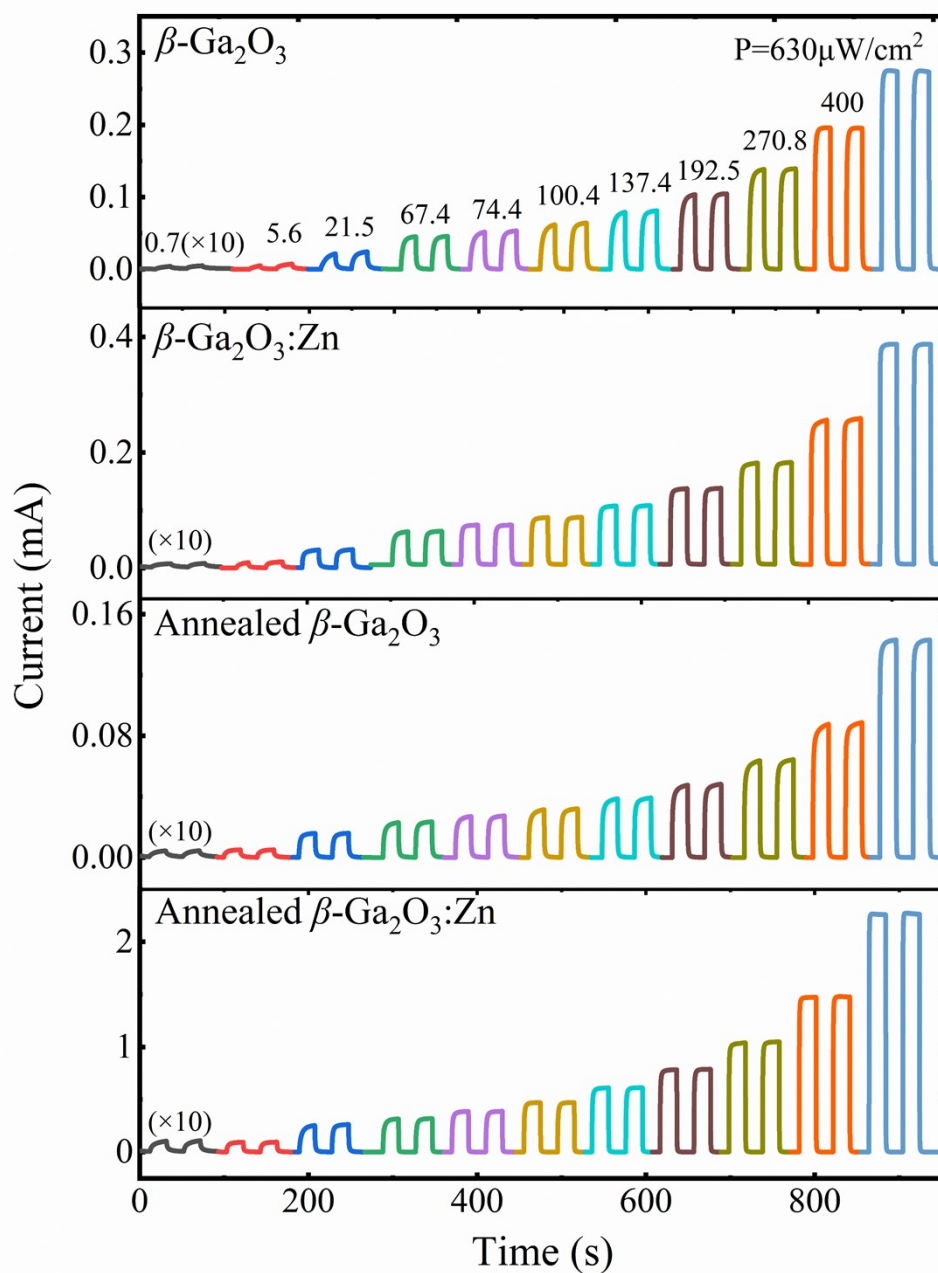
**Figure S1** EDS spectra of as-grown and annealed  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>:Zn thin films.

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**Figure S2** XPS survey spectra of (a) pure  $\beta\text{-Ga}_2\text{O}_3$ , (b) annealed  $\beta\text{-Ga}_2\text{O}_3$ , (c)  $\beta\text{-Ga}_2\text{O}_3\text{:Zn}$  and (d) annealed  $\beta\text{-Ga}_2\text{O}_3\text{:Zn}$  films.



**Figure S3** Time-dependent photocurrent characteristics of the photodetectors under 254 nm illuminations with different light intensities from  $0.7 \mu\text{W}/\text{cm}^2$  to  $630 \mu\text{W}/\text{cm}^2$  at 10 V bias.