Supporting Information (SI) for Self-catalyst $\beta$-Ga$_2$O$_3$ semiconductor lateral nanowire networks synthesis on the insulating substrate for deep ultraviolet photodetectors

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1. Experimental setup of $\beta$-Ga$_2$O$_3$ NWs growth

![Experimental setup of $\beta$-Ga$_2$O$_3$ NWs growth](image1)

Figure S1. Experimental setup of $\beta$-Ga$_2$O$_3$ NWs growth

2. The average diameter of the statistics nanowires

![SEM image and histogram](image2)

Figure S2. (a) SEM image; (b) histogram of the diameter of the statistics nanowires

3. TGA test for nanowire surface about ratio among organic vs inorganic.

![TGA plot](image3)

Figure S3. TGA of $\beta$-Ga$_2$O$_3$ nanowires
4. SEM image of β-Ga₂O₃ nanowires at 20 minutes growth time.

Figure S4. SEM image of β-Ga₂O₃ nanowires at 20 minutes growth time (a) Large scope. (b) single nanowire enlarged view

5. Spectral response of photodetector

Figure S5. Spectral response of photodetector from 245 nm to 600 nm wavelength

6. Optical image of MSM β-Ga₂O₃ NWs photodetector device

Figure S6. MSM β-Ga₂O₃ NWs photodetector device