

† Electronic supplementary information (ESI)

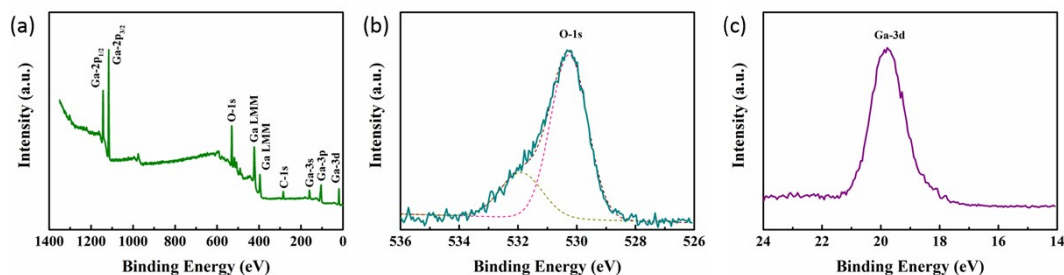


Fig. S1 XPS patterns of α -Ga₂O₃ nanorods array: survey spectrum (a), O 1s (b), Ga 3d (c).

Table S1

Table S1 Semi-quantitative analysis for the component content of α -Ga₂O₃ nanorods array sample by XPS

The survey spectrum of the film shown in Fig. S1(a) shows that only Ga and O can be detected. The O 1s core level of the film is also shown in Fig. S1(b), which is deconvoluted into two components. The sharp main peak located at 530.2 eV is attributed to the Ga–O bonds with the highest oxidation state of Ga from Ga₂O₃. The small shoulder centred at 532.0 eV presumably relates to the existence of ionization associated with weakly adsorbed species on the surface under air exposure. Fig. 1(c) can be assigned to Ga 3d from Ga₂O₃ (20.0 eV). Semi-quantitative analysis of sample surface component content (table S1) by XPS shows a gallium/oxygen atomic ratio close to 2:3.

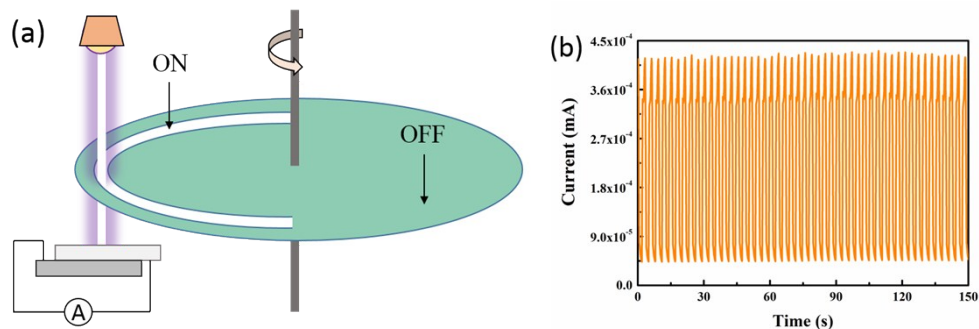


Fig. S2 The schematic illustration of the automatic switching device (a) and the time-current response of the improved device in 50 cycles under on/off UV light of 254 nm, 400 μ w/cm² (b)..

The automatic switching device was set with a rotational speed of 20 rpm, avoiding the error caused by human operation. The PEC UV-PD is really stable under 50 cycles under the time-current response testing.