Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

High-detectivity Ultraviolet Photodetectors based on Laterally Mesoporous GaN

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S1. Electro-chemical etching

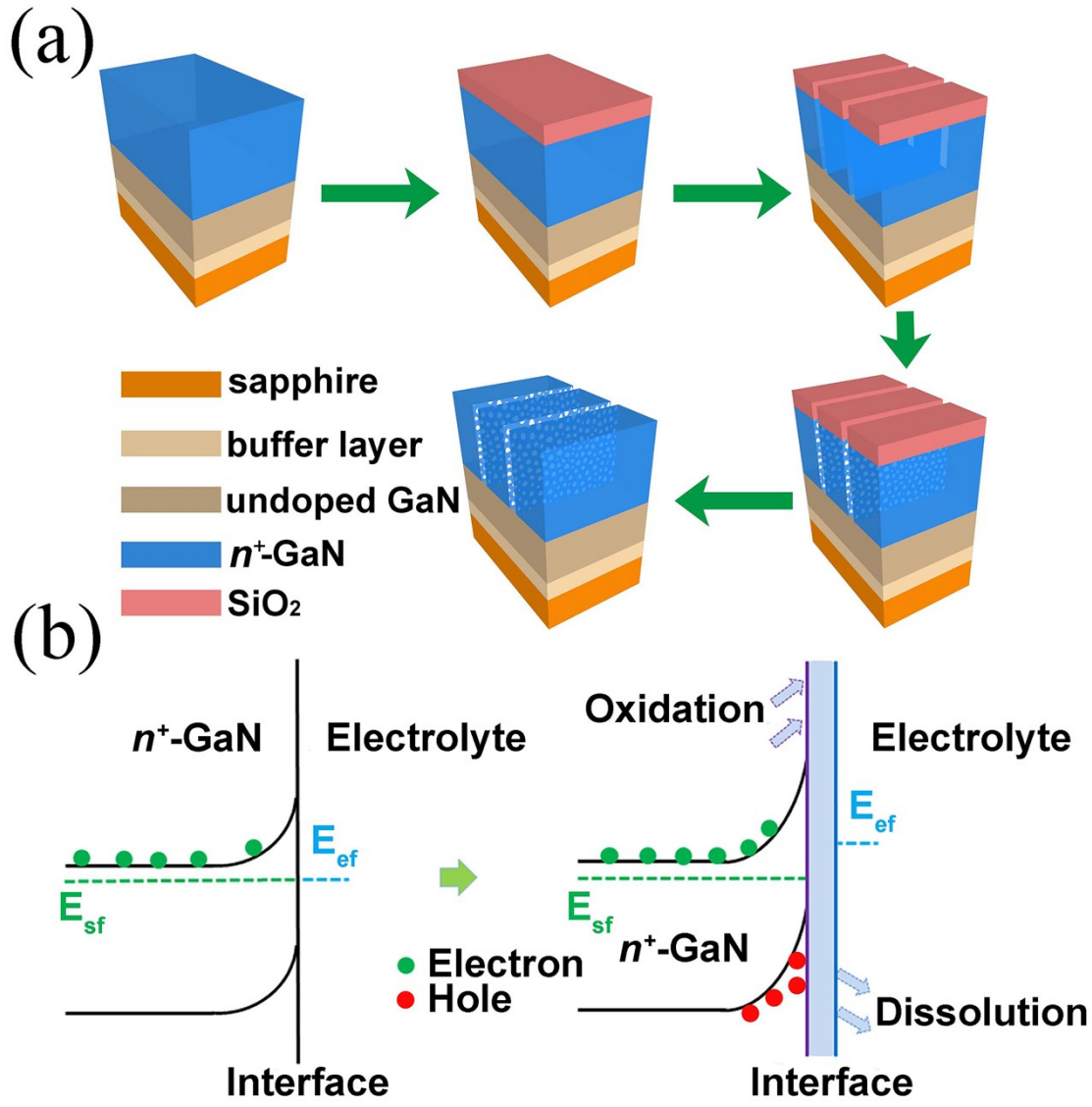

Fig. S1 (a) Schematic of the electro-chemical etching process to form the mesoporous GaN; (b) energy band diagram describing the chemical reaction process during electro-chemical etching.

S2. Temporal response

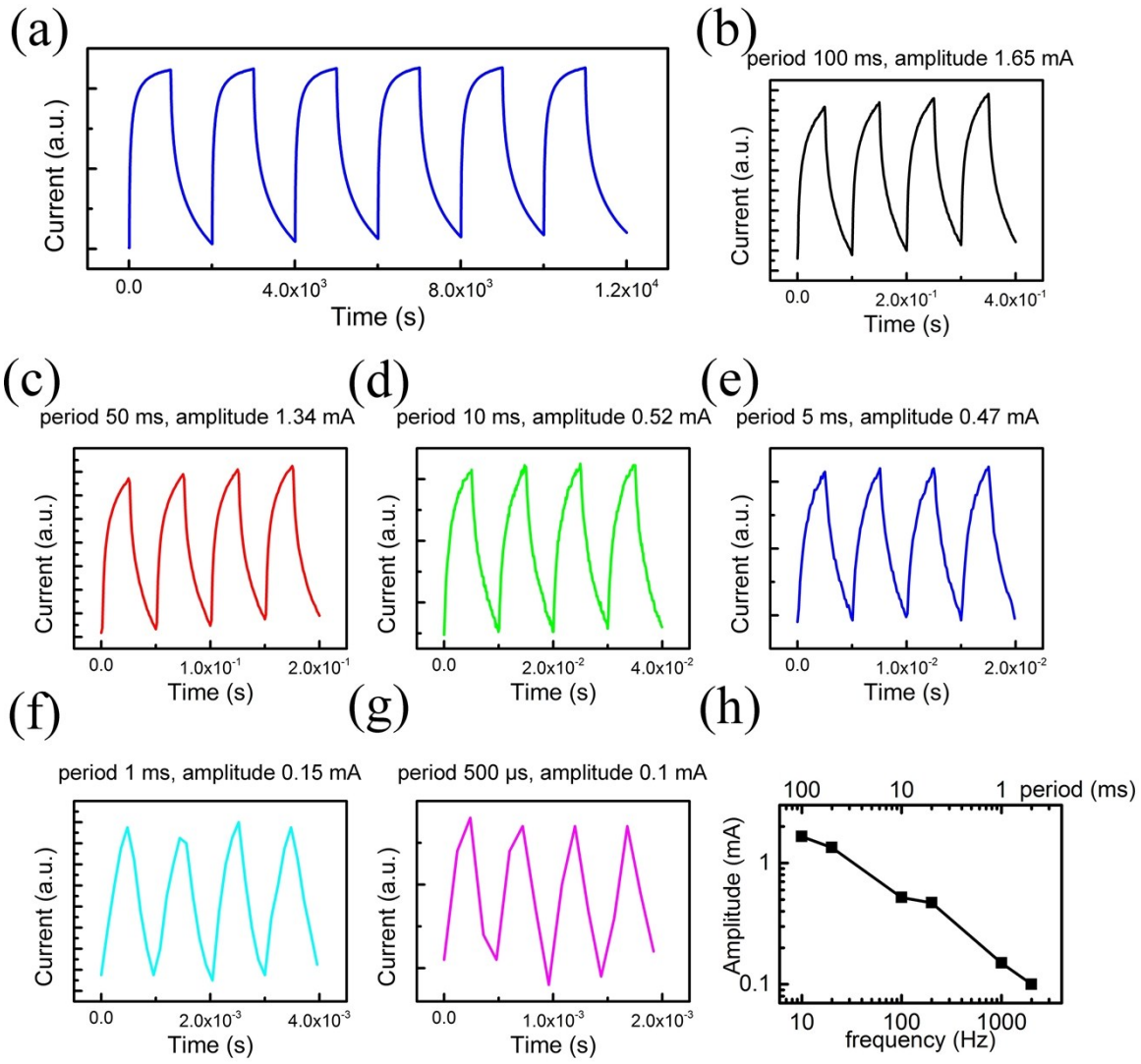

Fig. S2 (a) Time-resolved response of mesoporous GaN photodetector measured at switching period of 2×10^3 s; (b-g) time-resolved response of mesoporous GaN photodetector measured with different light switching periods; (h) response current amplitude versus the switching frequency (period).

We have carried out a series of time-resolved measurements with different light switching periods. As shown in Fig. S2 (a), for a switching period of 2×10^3 s the current increases very fast initially and then saturates slowly; a similar behavior is observed for the decay curve and for switching periods as short as 500 µs (Fig. S2b-g). As shown in Fig. S2 (h), the current amplitude decreases with increasing switching frequency f. The lowest measured current amplitude is 100 µA at $f \sim 2\times10^3$ Hz.