

## Supporting Information

### **A High Performance Self-powered Ultraviolet Photodetector Based on p-GaN/n-ZnMgO Heterojunction**

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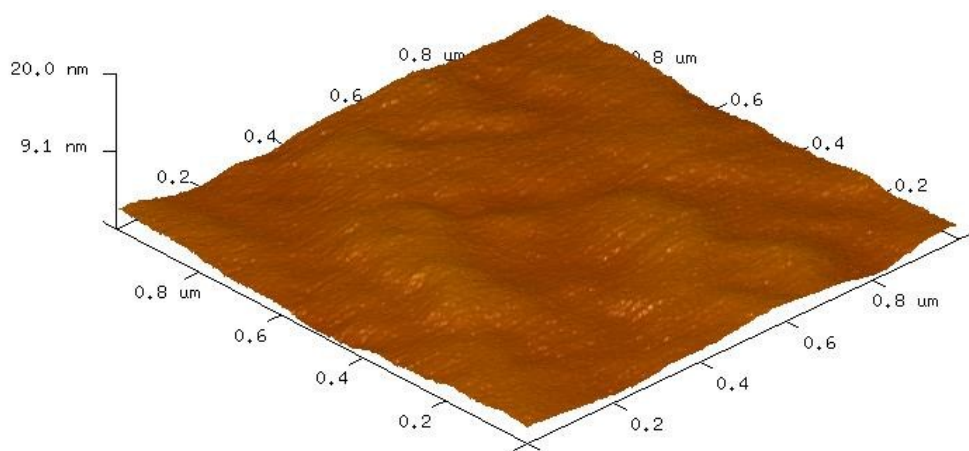


Figure S1. AFM image of p-GaN film grown on u-GaN/sapphire template by MBE

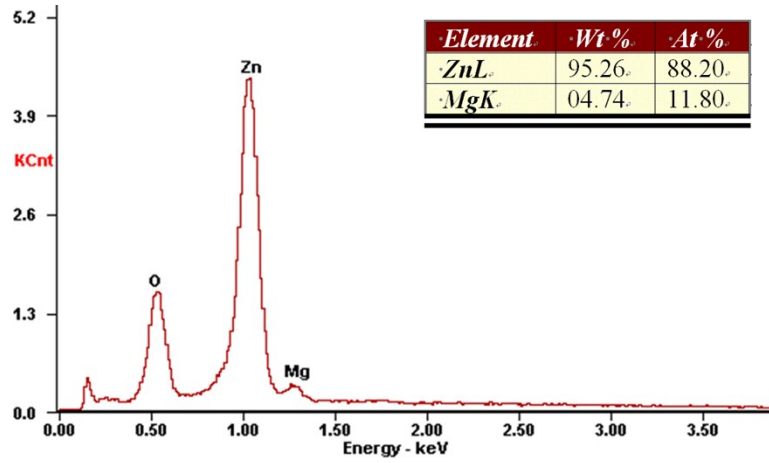


Figure S2. EDS spectrum of the n-ZnMgO film grown on the sapphire substrate by MOCVD

Table S1. Parameter comparisons of p-GaN used in previously reported p-GaN/n-Zn(Mg)O heterojunction photodetectors.

Preparation method	FWHM(0002)	Hole concentration/(cm <sup>-3</sup> )	Carrier mobility/(cm <sup>2</sup> /Vs)	Ref.
commercial p-GaN	--	3×10 <sup>17</sup>	10	25
MOCVD	0.078°	4×10 <sup>17</sup>	5.06	18
commercial HVPE	--	1.1×10 <sup>17</sup>	1	19
commercial p-GaN	--	--	--	26
MBE	0.0584°	9.2×10 <sup>18</sup>	2.2	This work