Online supporting materials

Ordered nanowire array blue/near-UV light emitting diodes

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Figure S1. Linear plot of the I-V curve of the heterostructure at room temperature in dark. Inset plots are the I-V curves of the Ni/Au-pGaN-Ni/Au contacts (blue), the silver paste-ITO-silver paste contacts (red), and the silver paste-ITO-ZnO-ITO-silver paste contacts (green). To reduce the noise, high voltages (10 V) were applied first to burn off the organics at the interface of the contacts. The turn on voltage of the diode is about 3.5 V, which is relatively low probably due to the existence of interface defects owing to the low growth temperature (<100 ℃) of the chemical method. In the forward bias region when the voltage is above the threshold, the soft turn on is caused by the resistances (~3600 Ω) from the p-GaN thin film, contact between the nanowire and the substrate, and the nanowire itself, etc.

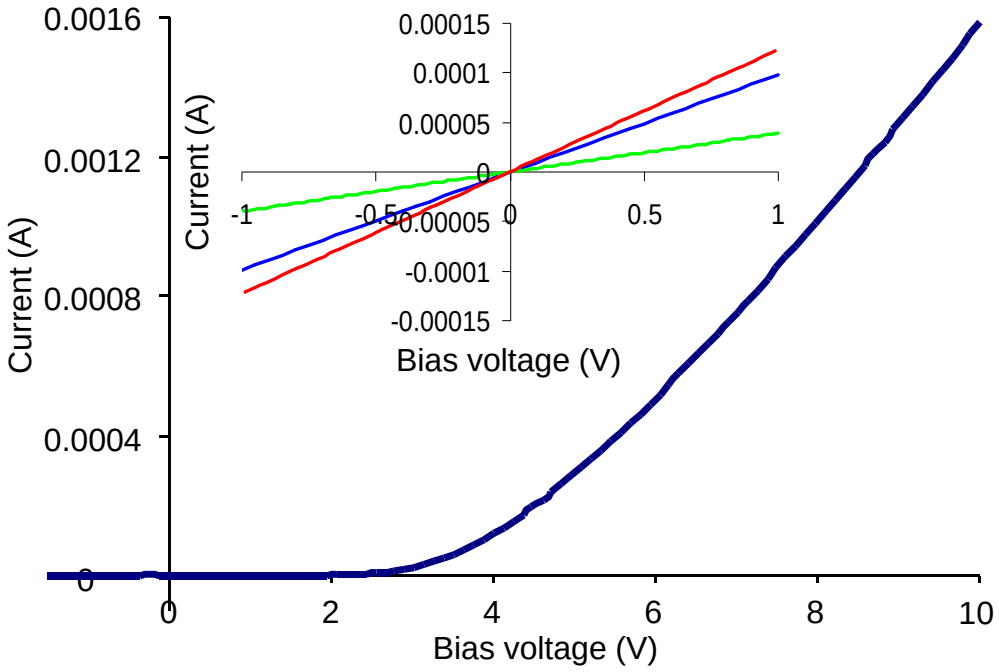

Figure S2. $L - I^m$ characteristics of *n*-ZnO/*p*-GaN heterostructure under room temperature.

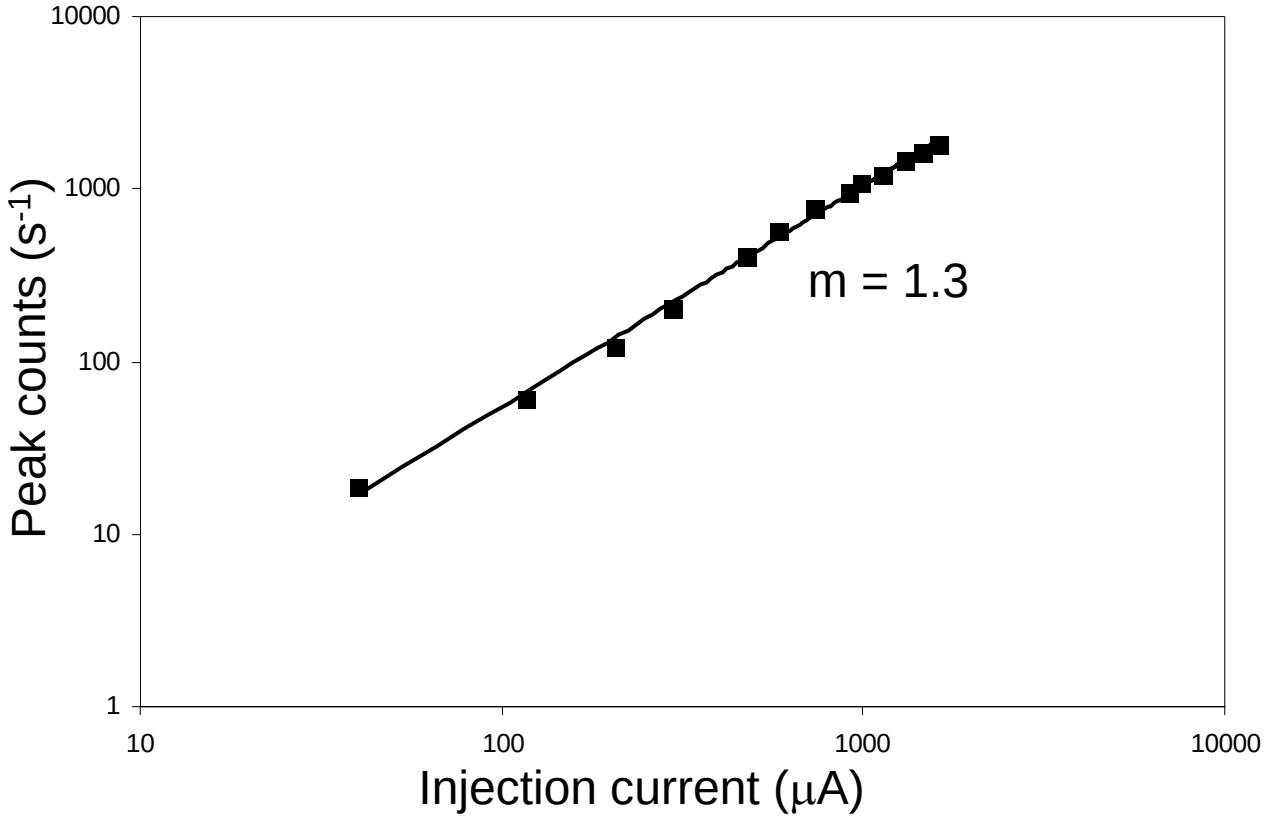

Figure S3. Simulated emission bands as a function of the biased voltage.

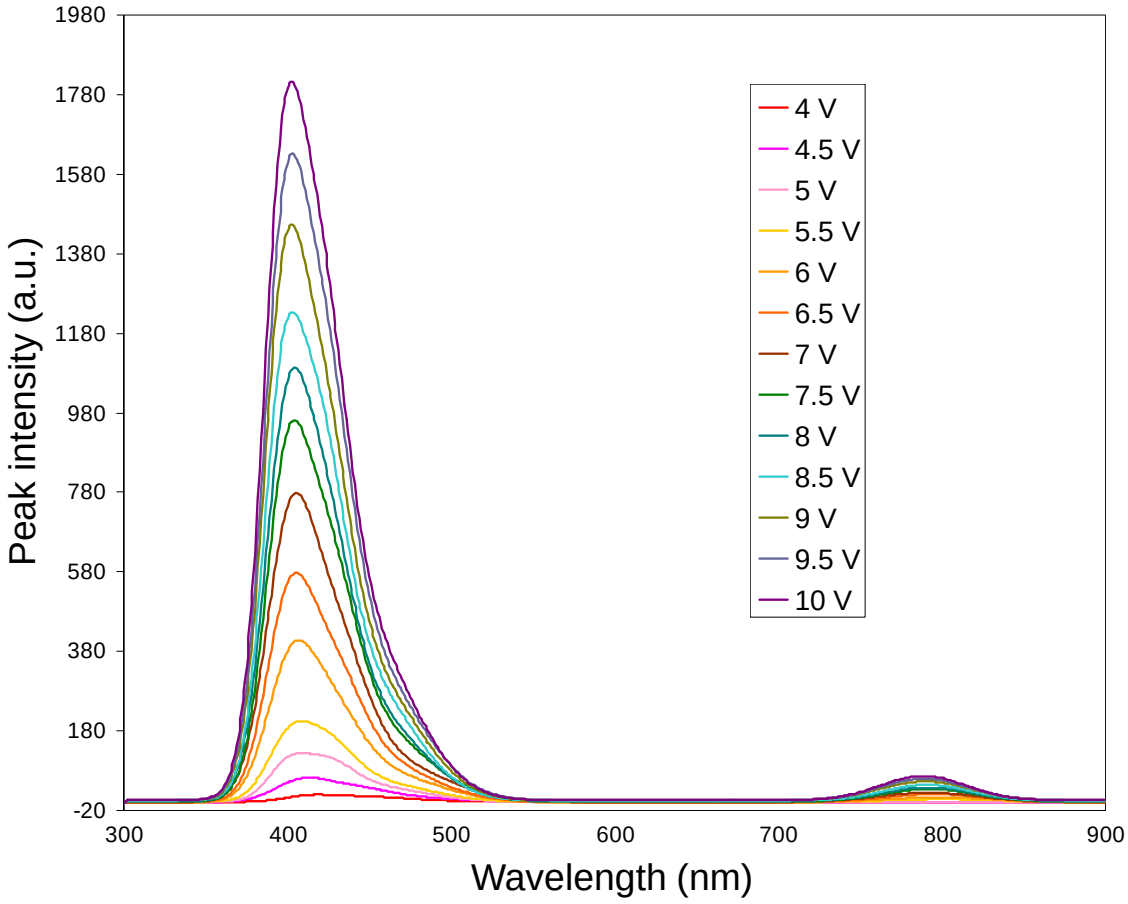

Figure S4. The band heights and band widths of the four emission bands as a function of the biased voltage.

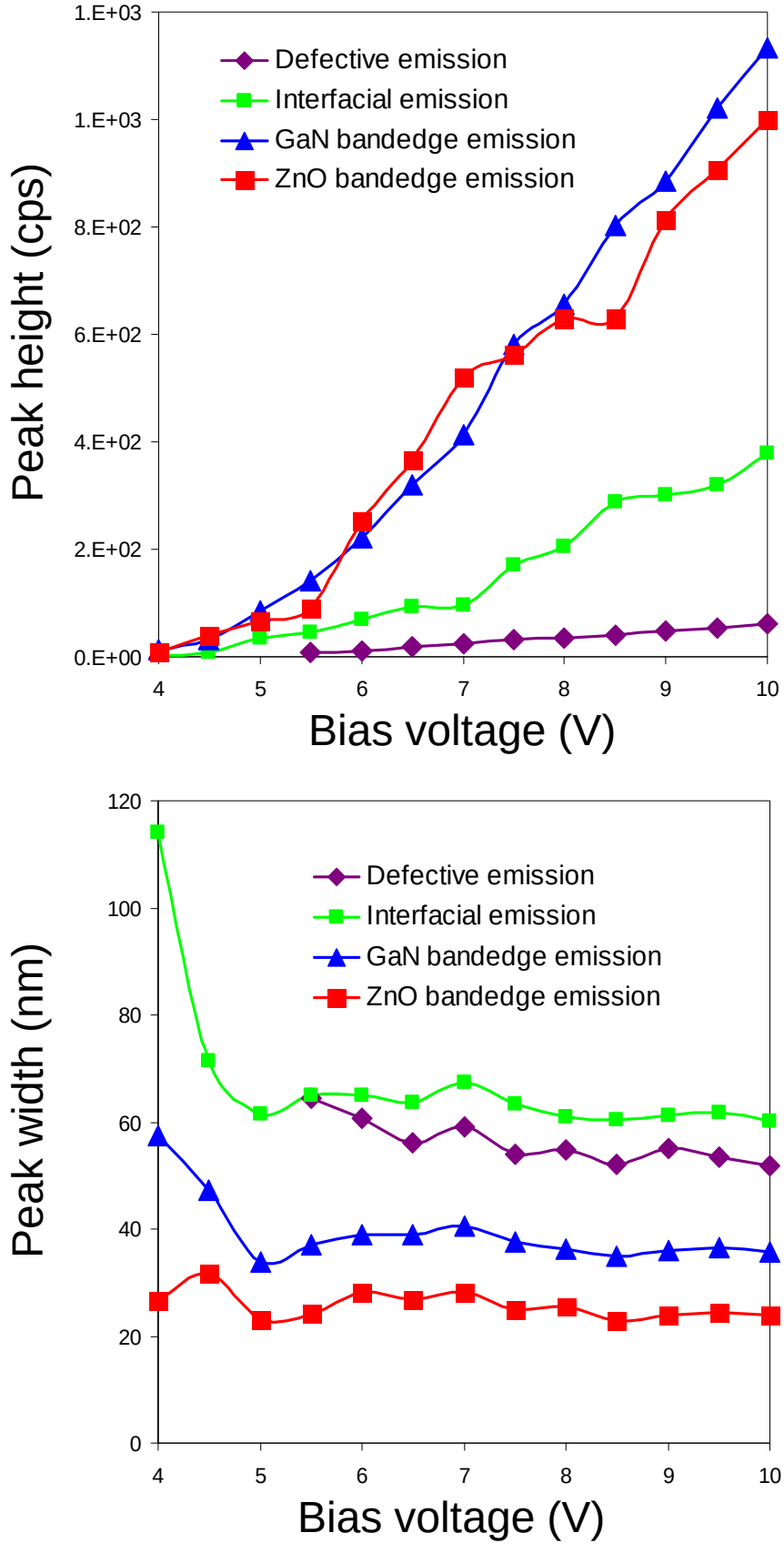

Table S1. Experimental data of the output light power of a heterostructural LED as a function of the biased voltage/injection current.

Biased Voltage (V)	Injection current (10^{-5} A)	Output light power (10^{-6} W)	External quantum efficiency (%)
5.0	16	20	2.50
5.5	22	30	2.48
6.0	29	43	2.48
6.5	36	58	2.48
7.0	45	78	2.48
7.5	54	98	2.42
8.0	64	129	2.52
8.5	75	155	2.43
9.0	87	193	2.46
9.5	99	229	2.43
10.0	110	283	2.57