Supporting Information for

Photo-Induced Doping in Graphene/Silicon Heterostructures

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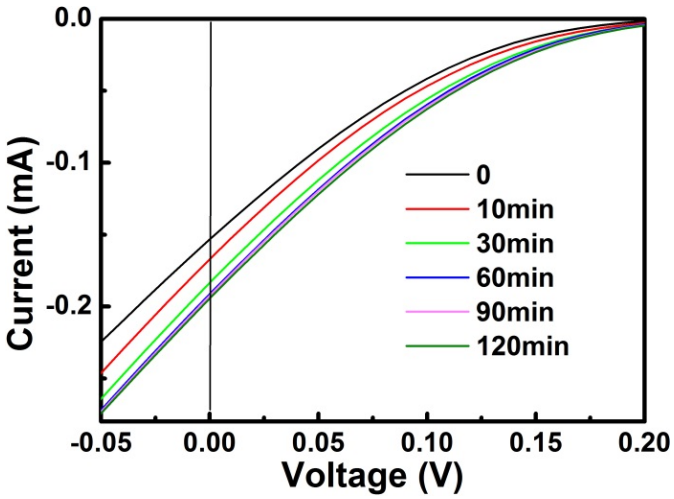

Figure S1. The *I*-*V* curves of a typical Gr/*n*-Si heterostructure under the white light illumination with different irradiation time in nitrogen. The results show that the photovoltaic properties of the Gr/n-Si junction enhance with the light irradiation time increasing, which are similar to the feature of the light *I*-*V* curves in air. The results should rule out the potential role of oxidation in air.

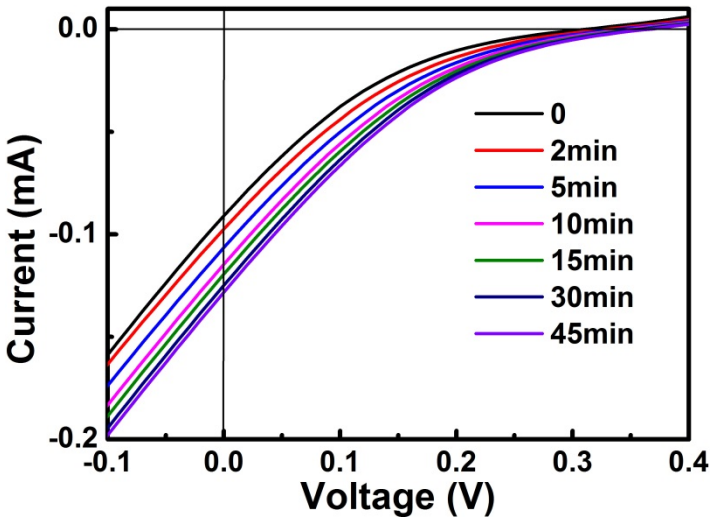

Figure S2. The *I-V* curves of a typical Gr/*n*-Si under the infrared light (808 nm) illumination with different irradiation time.

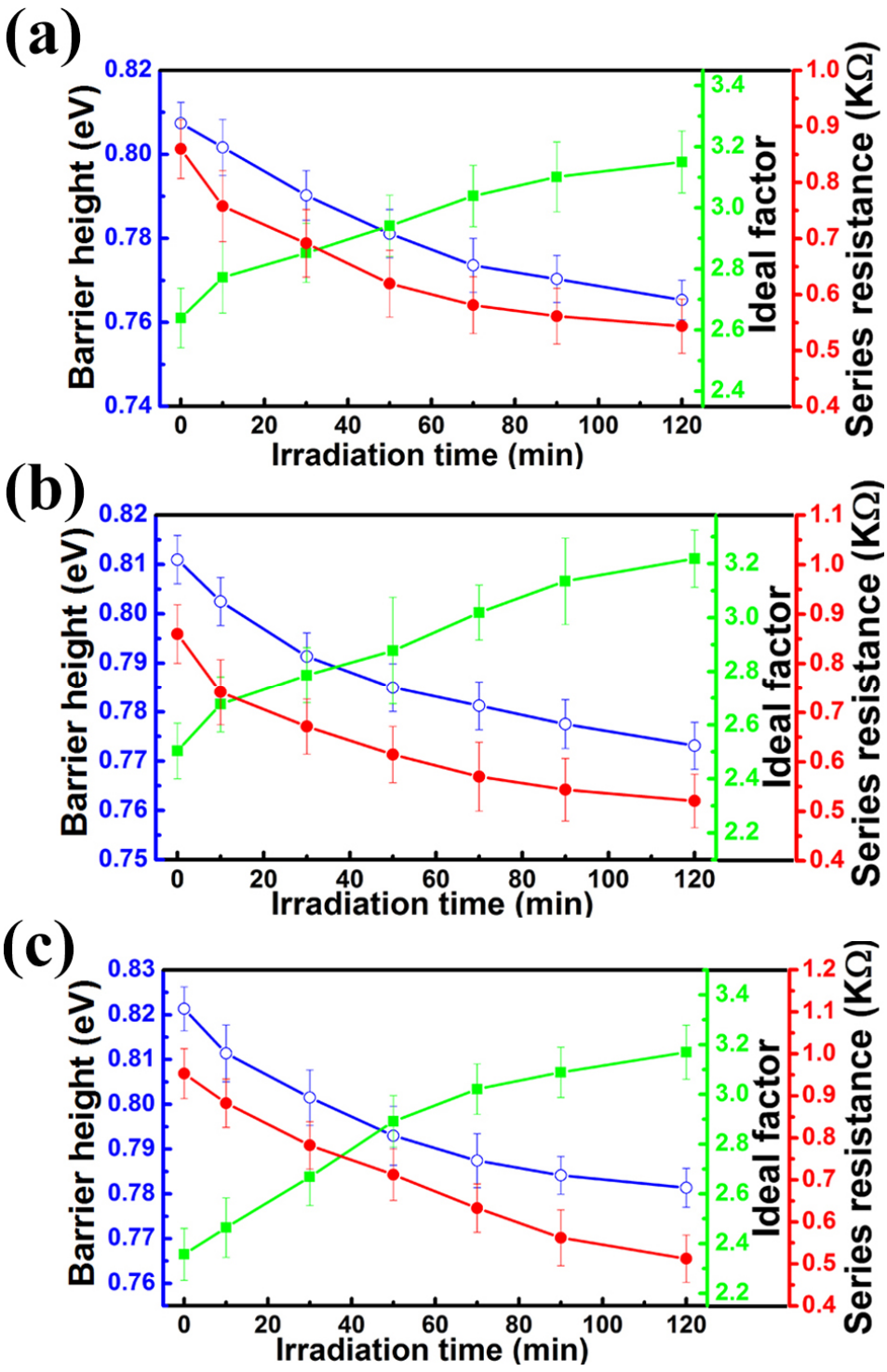

Figure S3. (a), (b) and (c) The barrier heights, the series resistances and the ideality factors of three Gr/*n*-Si heterostructures with different light irradiation time from 0 to 120 min, respectively. The light power is 1 mW. All of them have similar features.

Table SI Characteristics of the three Gr/*n*-Si heterostructures before and after irradiation for 120 min. The light power is 1 mW. All of them have similar features.

	samples	Φ_B/eV	R_S/kΩ	n	Voc/V	Isc/mA	FF (%)	η (%)
1#	Before irradiation	0.807 ±0.005	0.865 ±0.055	2.639 ±0.095	0.322 ±0.001	0.245 ±0.008	13.773 ±0.101	1.082 ±0.093
	After irradiation	0.765 ±0.005	0.548 ±0.050	3.150 ±0.100	0.340 ±0.001	0.414 ±0.011	16.624 ±0.104	2.343 ±0.115
2#	Before irradiation	0.811 ±0.005	0.865 ±0.060	2.503 ±0.105	0.351 ±0.001	0.251 ±0.009	17.682 ±0.096	2.074 ±0.091
	After irradiation	0.77 ±0.005	0.525 ±0.055	3.22 ±0.105	0.370 ±0.001	0.428 ±0.010	19.076 ±0.102	3.023 ±0.088
3#	Before irradiation	0.821 ±0.005	0.960 ±0.060	2.357 ±0.105	0.313 ±0.001	0.389 ±0.011	17.077 ±0.105	2.056 ±0.114
	After irradiation	0.781 ±0.006	0.519 ±0.055	3.170 ±0.110	0.344 ±0.001	0.537 ±0.012	18.520 ±0.113	3.368 ±0.116