

Supporting Information

Enhanced light harvesting in photovoltaic devices using an edge-located one-dimensional grating polydimethylsiloxane membrane

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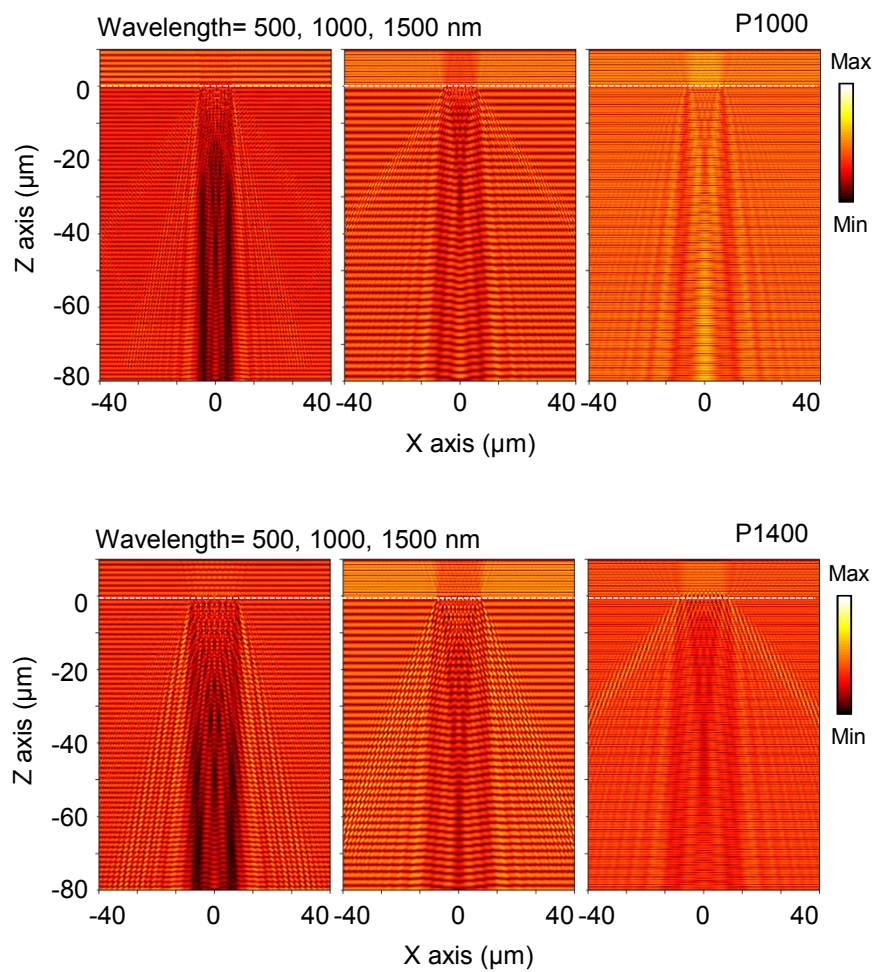


Figure. S1 Electric field distributions of ELG structure with period of 1000, 1400 nm at 500, 1000, 1500 nm wavelengths.

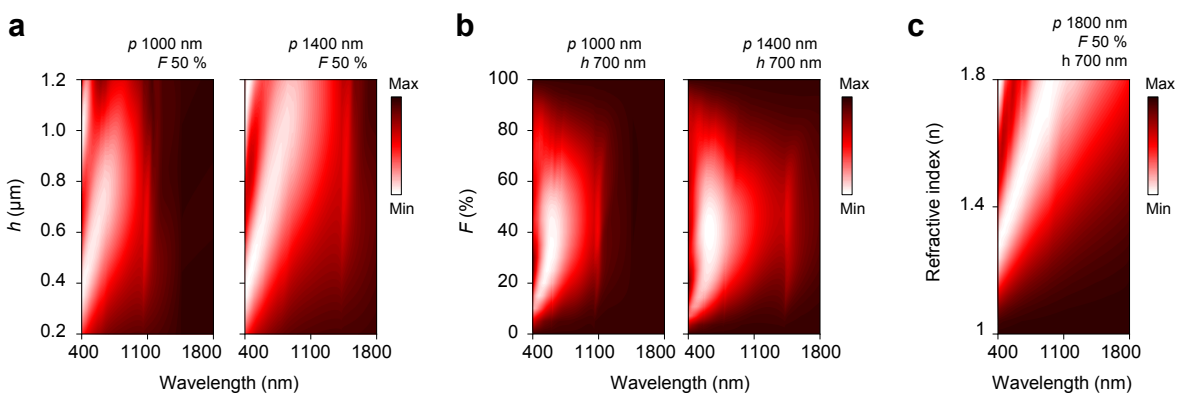


Figure. S2 Contour plots of zeroth order transmittance spectra with different a) height, b) filling fraction and c) refractive index of grating polymer.

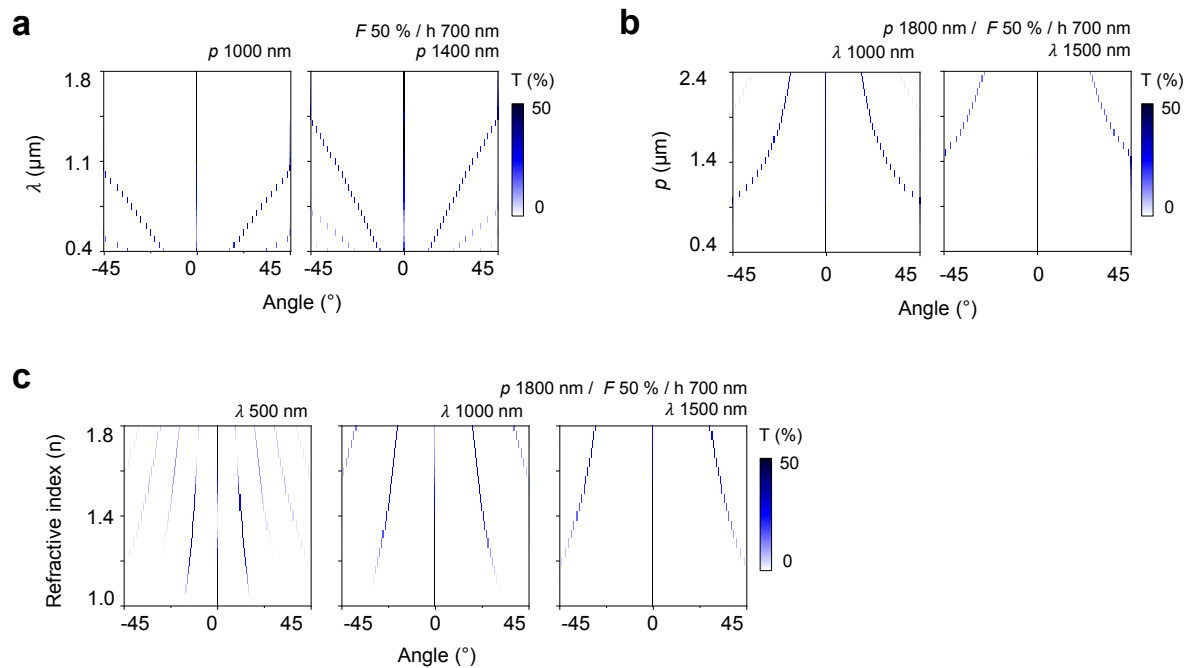


Figure. S3 Diffracted angle for ELG structure, according to a) wavelength, b) period, and c) refractive index of ELG polymer.

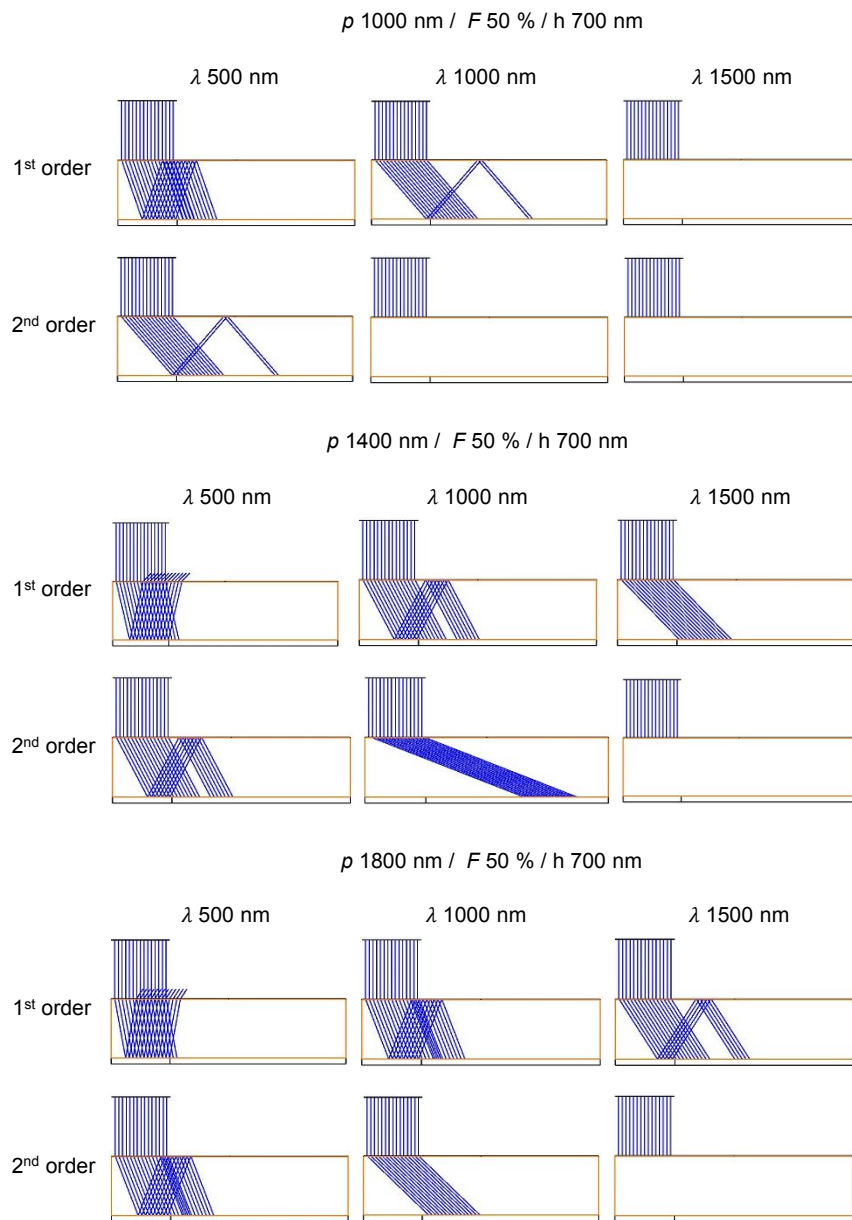


Figure. S4 Ray-tracing simulation results with period of 1000, 1400, and 1800 nm at 500, 1000, 1500 nm wavelengths.

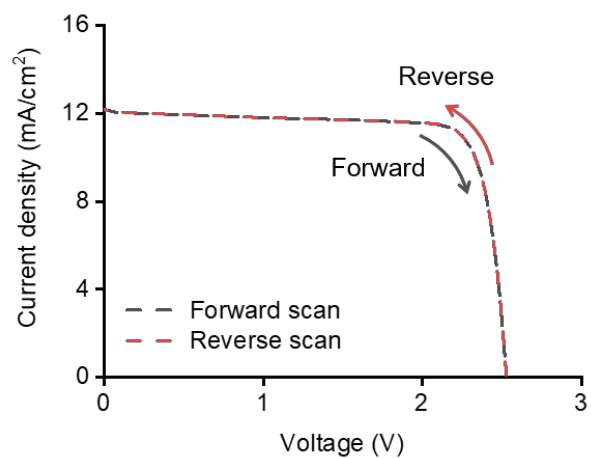


Figure. S5 Forward and reverse scan for InGaP/GaAs/Ge triple junction solar cell: Voltage range from 0 to 3 V (0.15mV steps) after delaying 1000 ms before illumination (AM 1.5G, 100mW/cm²).

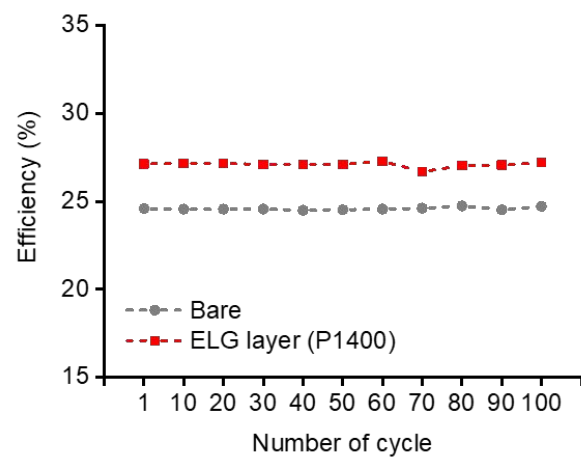


Figure. S6 Stability of the TJ cell efficiency upon repeated cycle with bare and ELG layer samples.

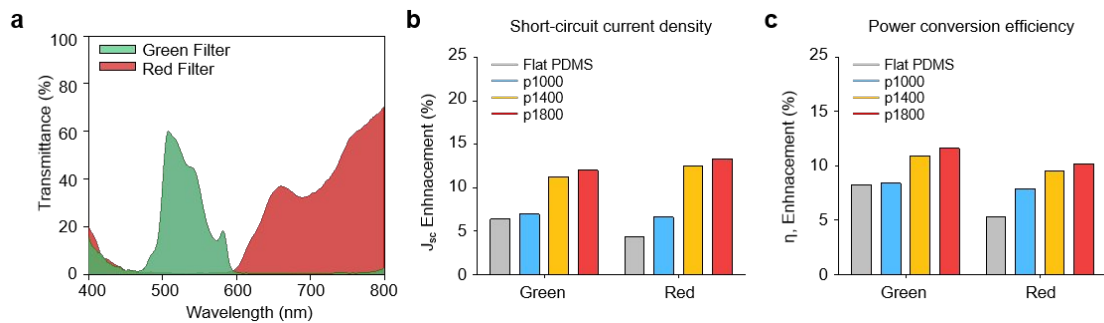


Figure. S7 (a) Optical properties of green and red transmissive filter. (b,c) Enhancement of short-circuit current and power conversion efficiency using solar simulator with green and red filter under one-sun of AM 1.5G at room temperature.

Device number		J_{sc} (mA/cm ²)	V_{oc} (V)	FF (%)	Efficiency (%)
1	Bare	12.2	2.5	80.4	24.52
	PDMS	12.39	2.5	80.5	24.93
	ELG (p1000)	12.76	2.5	80.8	25.77
	ELG (p1400)	13.28	2.5	81.1	26.92
	ELG (p1800)	13.38	2.5	81	27.09
2	Bare	12.13	2.5	80.5	24.41
	PDMS	12.39	2.5	80.6	24.96
	ELG (p1000)	12.76	2.5	81.0	25.83
	ELG (p1400)	13.32	2.5	81.2	27.03
	ELG (p1800)	13.4	2.5	81.1	27.16
3	Bare	12.23	2.5	80.5	24.61
	PDMS	12.56	2.5	80.4	25.24
	ELG (p1000)	12.8	2.5	80.8	25.85
	ELG (p1400)	13.35	2.5	81.1	27.06
	ELG (p1800)	13.38	2.5	80.9	27.06
4	Bare	12.2	2.5	80.4	24.52
	PDMS	12.42	2.5	80.6	25.02
	ELG (p1000)	12.8	2.5	80.9	25.88
	ELG (p1400)	13.55	2.5	81.1	27.43
	ELG (p1800)	13.5	2.5	81	27.33
5	Bare	12.19	2.5	80.5	24.53
	PDMS	12.5	2.5	80.4	25.12
	ELG (p1000)	12.9	2.5	80.8	26.05
	ELG (p1400)	13.15	2.5	82.7	27.18
	ELG (p1800)	13.42	2.5	80.8	27.10

Table S1 Electrical parameters of different TJ solar modules with bare and ELG layer.