Supplementary Information

A perovskite/silicon hybrid system with solar-to-electric power conversion efficiency of 25.5%

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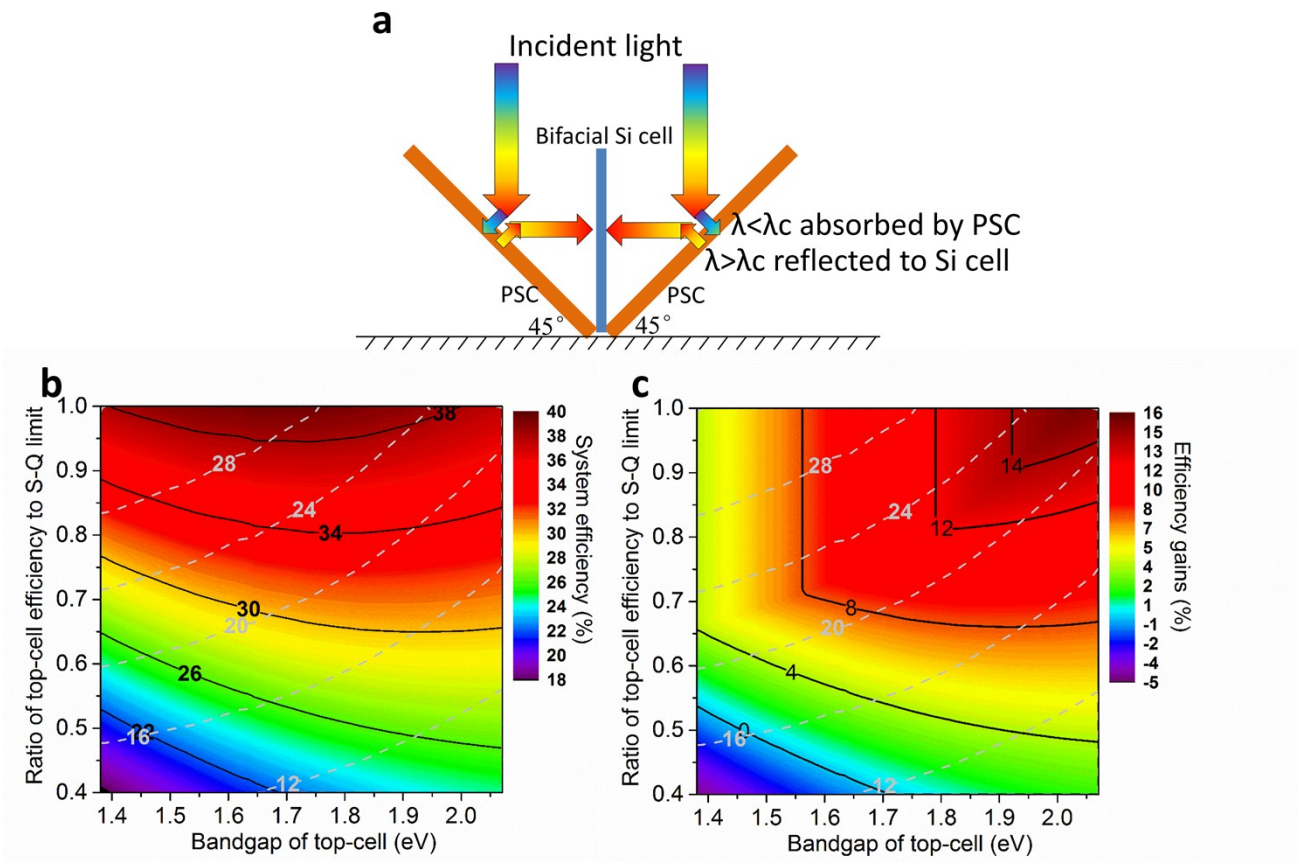

Fig. S 1 The calculated results of the BRTS with a 22.3% efficient bifacial HIT silicon sub-cell with f_1=0 and f_2=1 in equation (1). **a,** Schematic diagram of incident energy allocation. **b,** The possible efficiency and **c,** the efficiency gains as a function of the top-cell bandgap (abscissa axis) and the ratio of top-cell efficiency to S-Q limit (ordinate axis). The gray dash lines represent the efficiency of the perovskite solar cells (PSCs).

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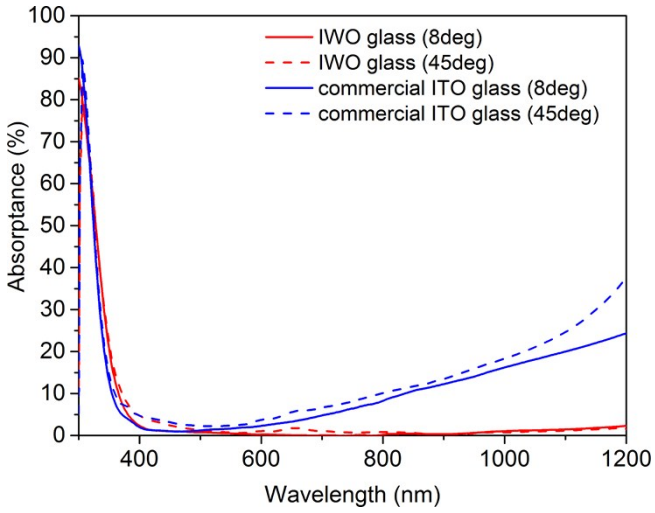

Fig. S 2 Wavelength-dependent absorptance curves of fabricated IWO glass (150 nm) and commercial ITO glass (150 nm). The solar-weighted absorptance between 750 nm and 1100 nm is 0.6% for IWO glass and 12.4% for ITO glass. The solar-weighted absorptance between 300 nm and 750 nm is 2.0% for IWO glass and 3.5% for ITO glass.

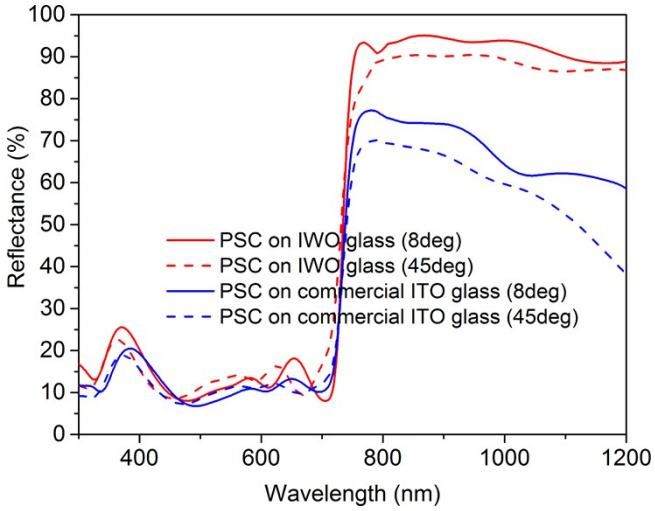

Fig. S 3 Wavelength-dependent reflectance curves of PSCs fabricated on IWO glass and commercial ITO glass, respectively. The solar-weighted reflectance between 750 nm and 1100 nm is 88.5% for IWO based PSC and 64.4% for ITO based PSC at 45°. The solar-weighted reflectance between 300 nm and 750 nm is 16.0% for IWO based PSC and 12.9% for ITO based PSC at 45°.

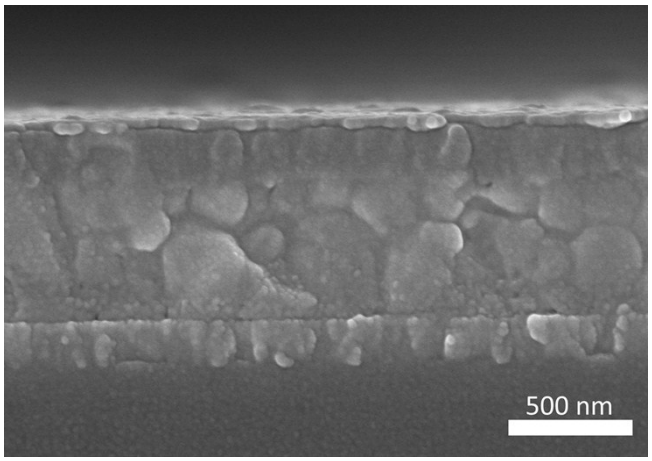

Fig. S 4 Uncolored FESEM image for the cross section of PSC

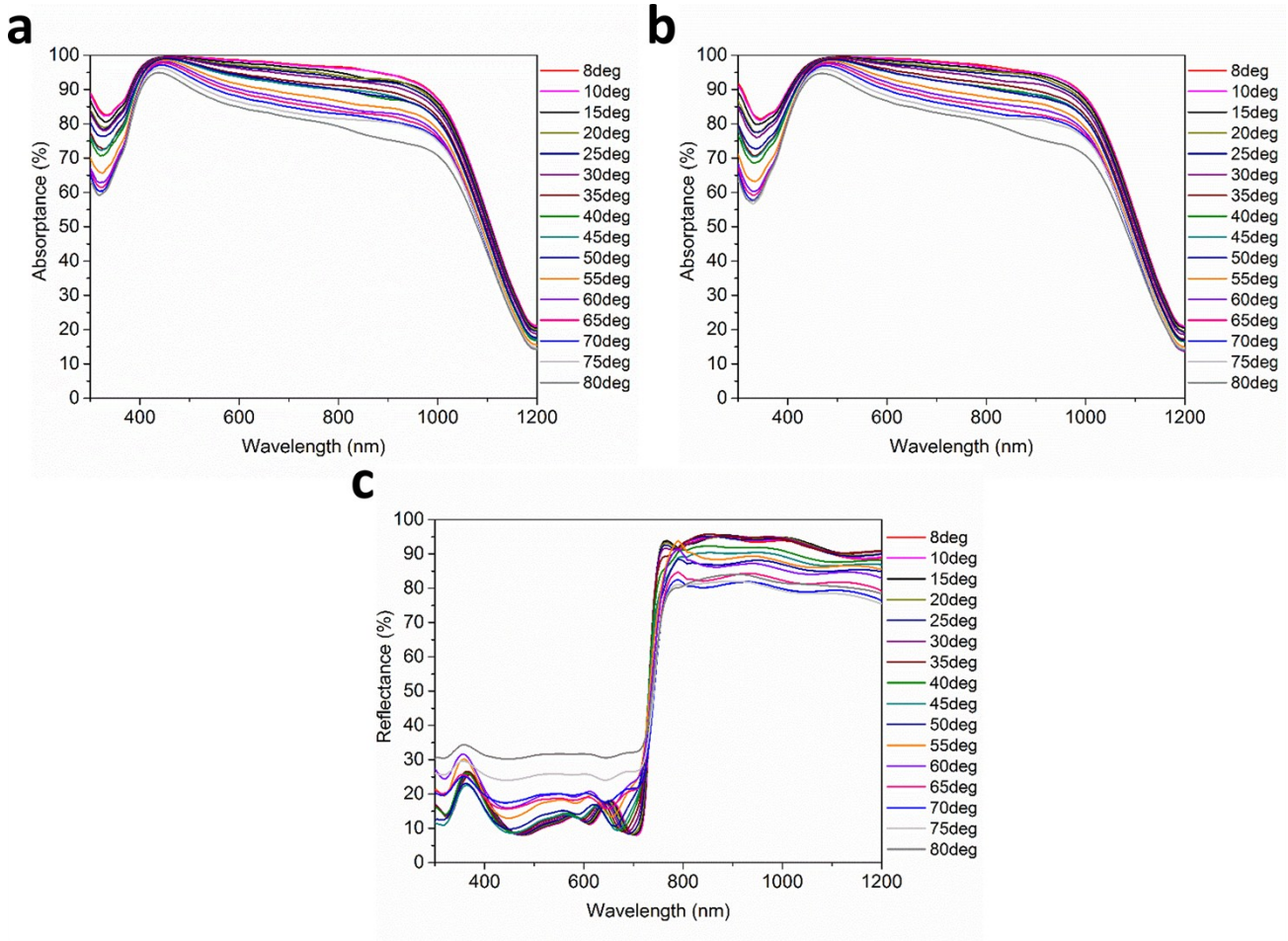

Fig. S 5 a, Wavelength-dependent absorptance curves of the front side of HIT solar cell at various incident angles. **b**, Wavelength-dependent absorptance curves of the rear side of HIT solar cell at various incident angles. **c**, Wavelength-dependent reflectance curves of the PSC at various incident angles.

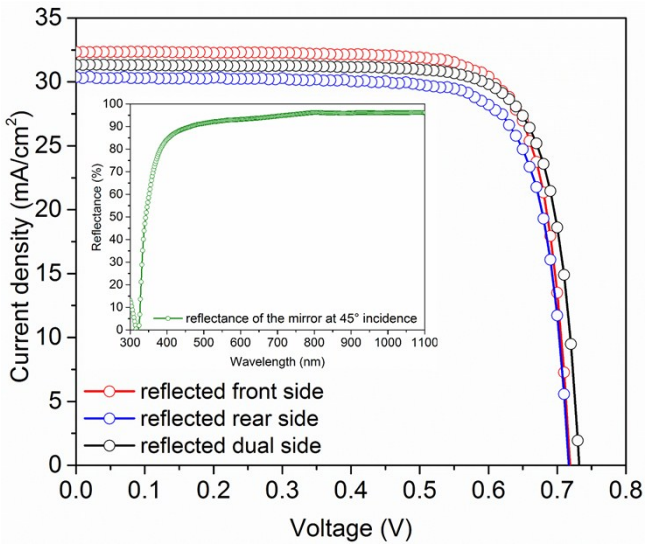

Fig. S 6 Performance of a HIT bifacial silicon cell integrated with two mirrors in a V-shape configuration under 1 sun illumination. Corresponding parameters are summarized in Table S1. The insert image is the reflectance of the mirror for wavelengths of 300 nm-1100 nm at 45° incidence (with solar-weighted reflectance of 92%).

Table S 1 The performance of a bifacial HIT silicon solar cell

	V_{OC} (V)	J_{SC} (mA/cm²)	FF	Efficiency (%)
Si cell (reflected front side)	0.719	32.34	0.784	18.24
Si cell (reflected rear side)	0.717	30.33	0.780	16.97
Si cell (reflected dual side)	0.732	31.33	0.788	18.07