

Electronic Supplementary Information

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Fabrication of CuInS₂/ZnS quantum dot nanocomposite films and investigation of their influence on performance of soda glass-based luminescent solar concentrators

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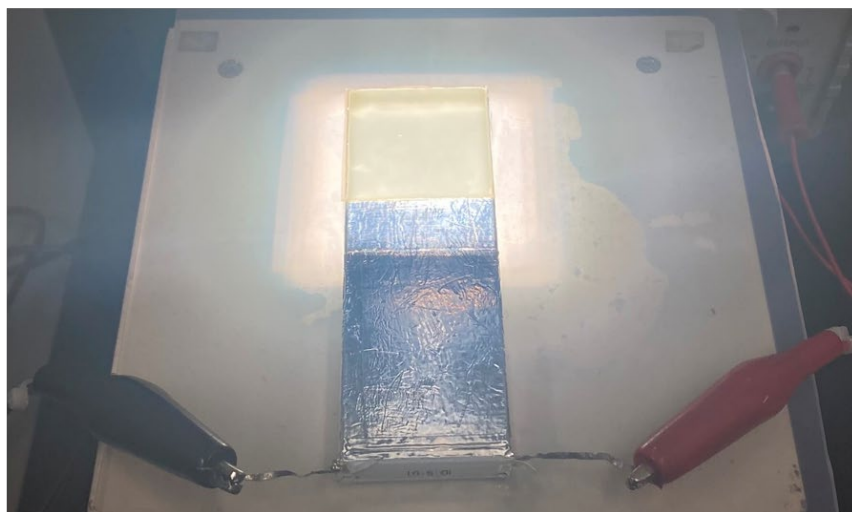
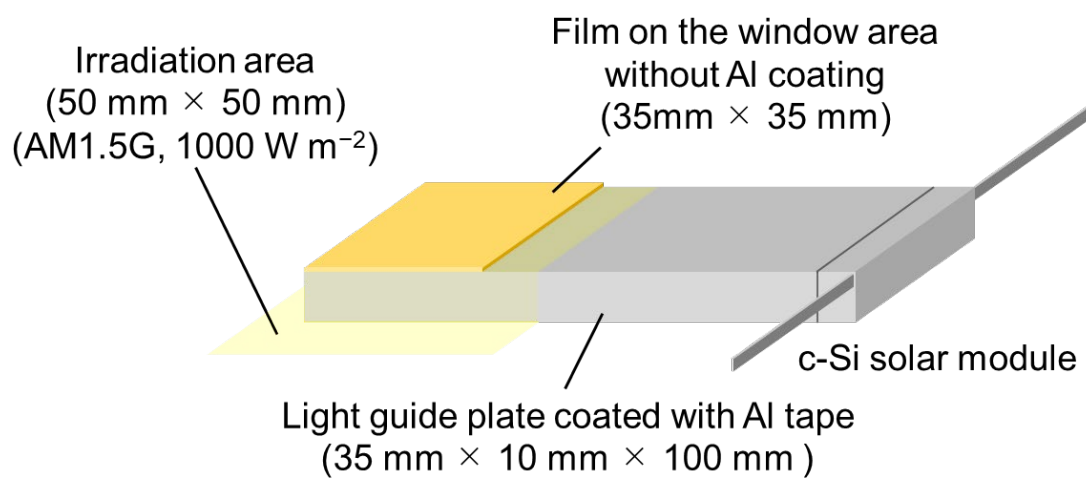


Fig. S1 Schematic illustration and photograph of the LSC with a nanocomposite film under the simulated solar light. With the exception of the window area, all areas are coated with aluminum tape.

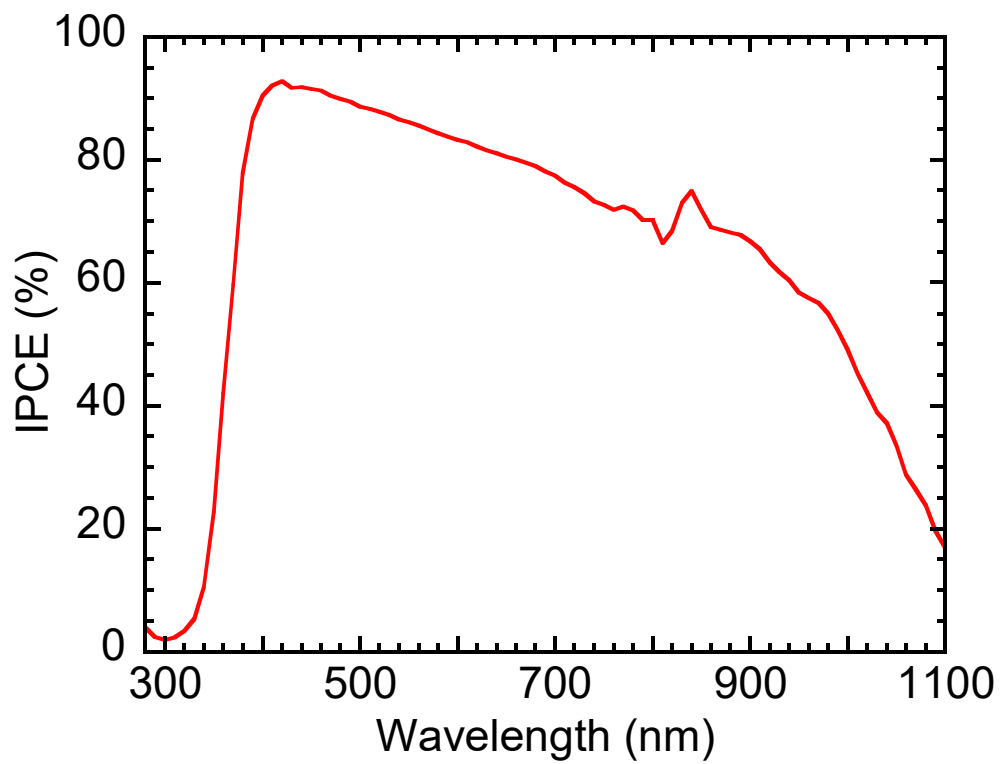


Fig. S2 Original IPCE spectrum of the c-Si solar module.

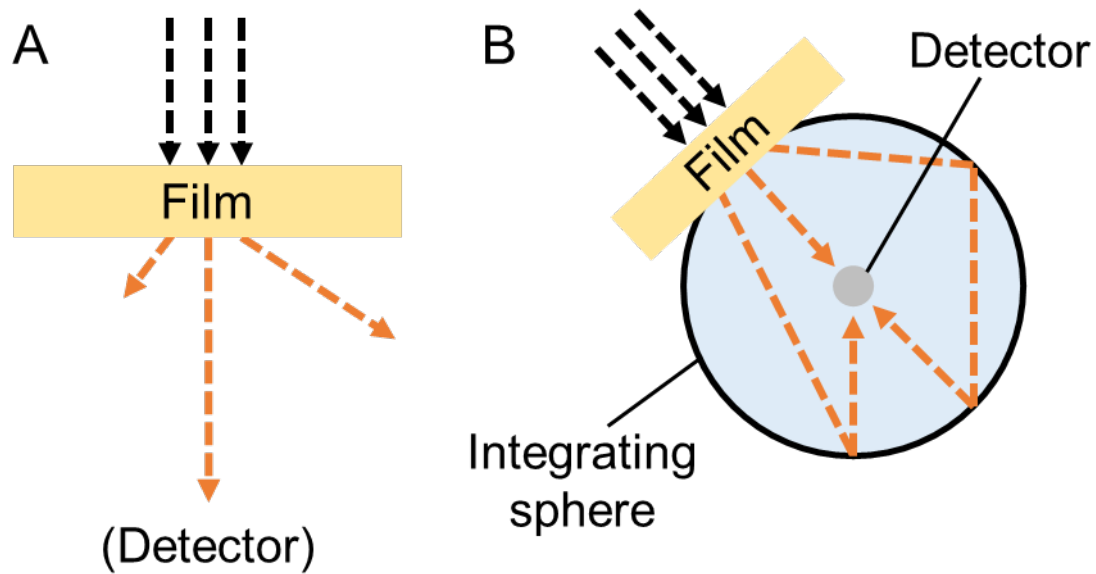


Fig. S3 Illustration of the measurements of (A) in-line and (B) total transmission spectra for the film samples.

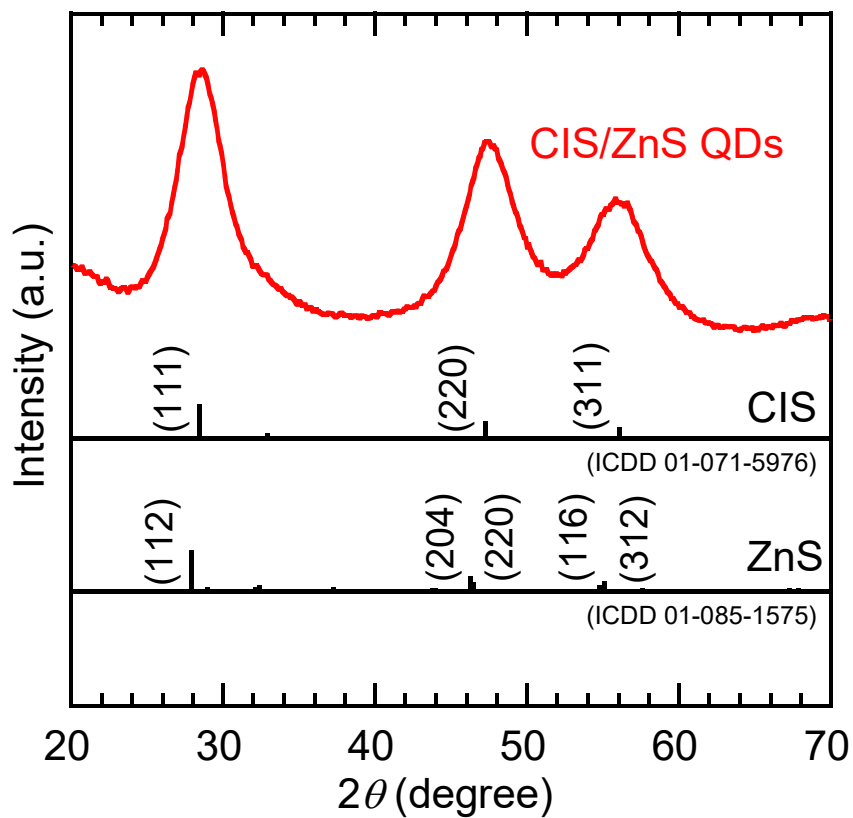


Fig. S4 XRD profile of the solid CIS/ZnS QD sample. ICDD card data of chalcopyrite-type CIS (no. 01-085-1575) and sphalerite-type ZnS (no. 01-071-5976) are also shown.

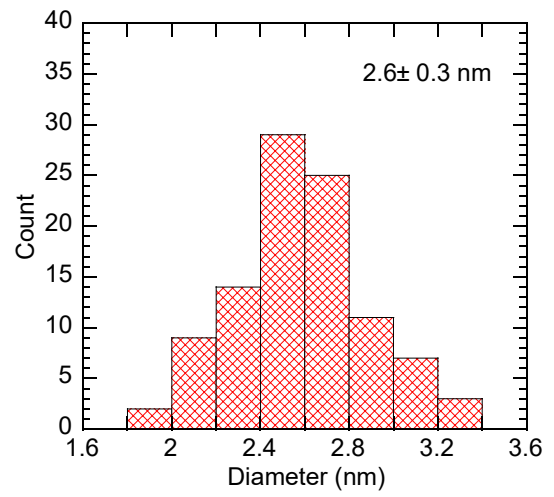
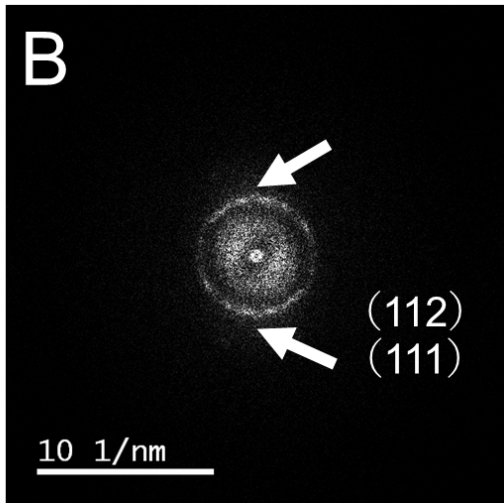
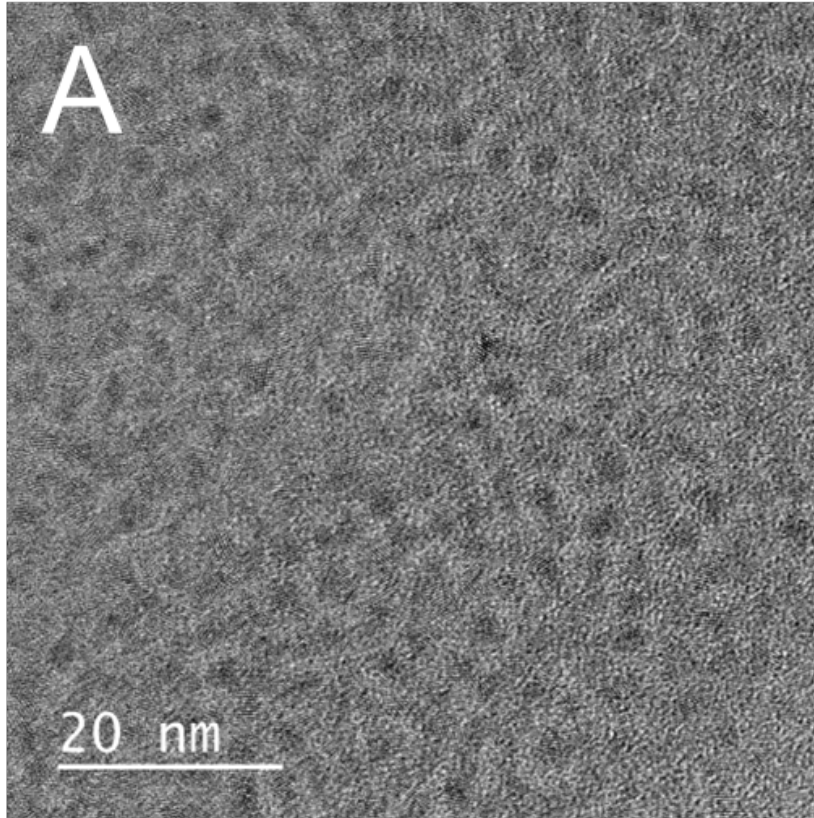


Fig. S5 (A) FE-TEM image, (B) FFT image, and (C) particle size distribution of the QDs.

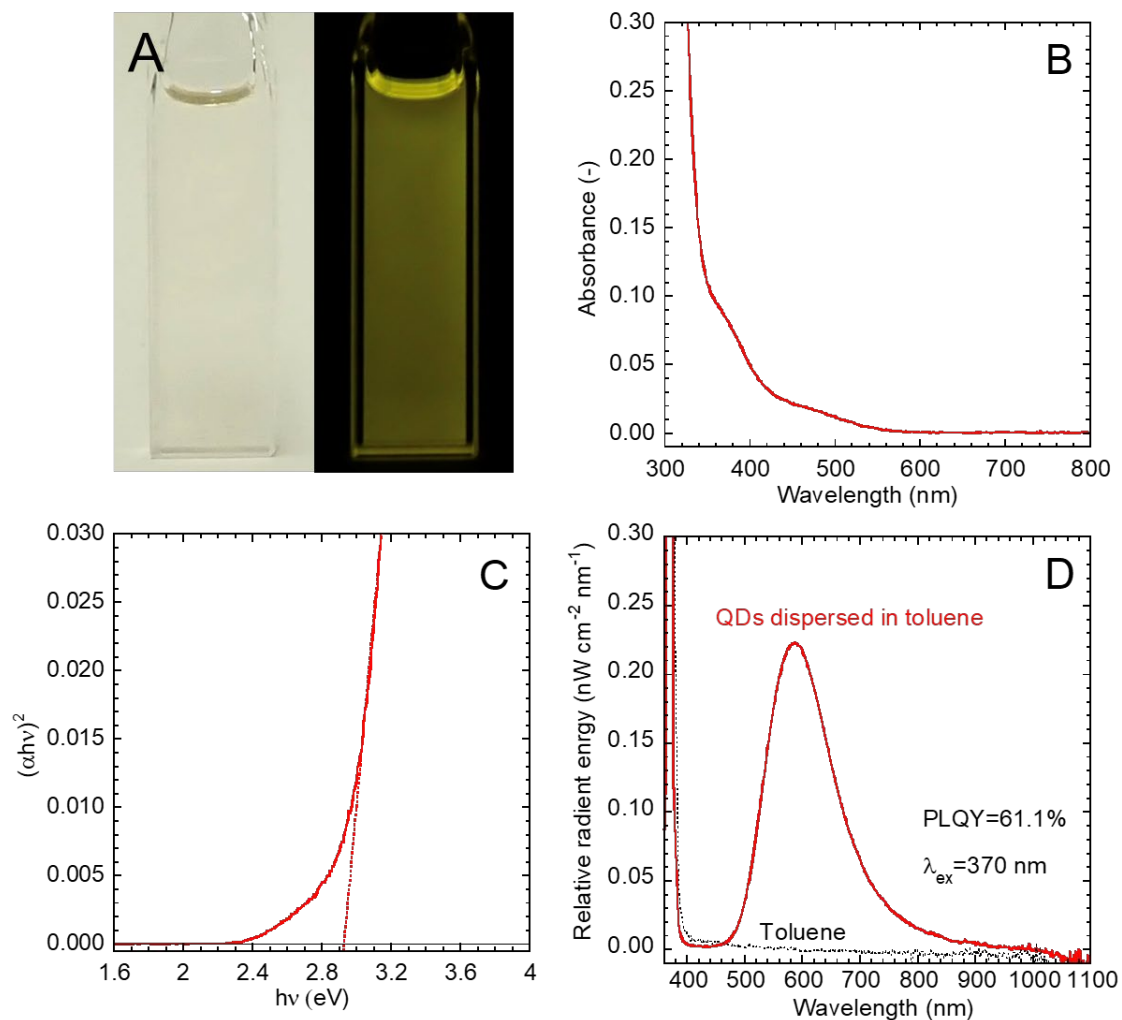


Fig. S6 (A) Photographs under white light and 365 nm UV light, (B) net UV-vis absorption spectrum, (C) corresponding Tauc plot and (D) PL spectrum for the QD dispersion in toluene. The absolute PLQY was determined from the PL spectra of the QD dispersion and blank toluene.

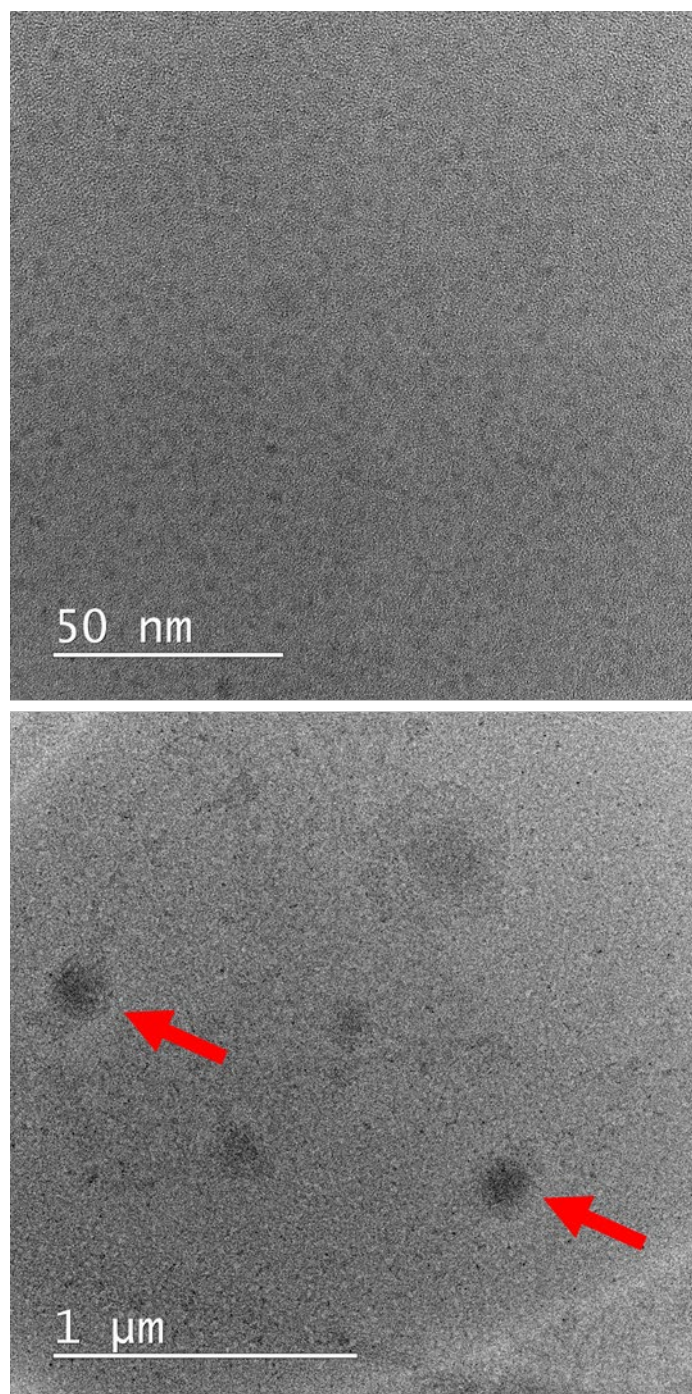


Fig. S7 FE-TEM images of QDs in QDs@EVA film with the QD concentration of 6.2 wt%. The arrows point to aggregates.

Table S1 Change in PLQY of the nanocomposite film with the QD concentration.

Concentration	PLQY (%)
3.2 wt%	61.2
6.2 wt%	57.7
9.0 wt%	57.8
11.7 wt%	54.1

Table S2 Summary of the I - V curve measurements shown in Fig. 3(A).

Film sample	I_{sc} (mA)	V_{oc} (V)	FF
Without film	0.778	0.466	0.629
Blank EVA	0.815	0.466	0.634
3.2 wt%	1.109	0.48	0.655
6.2 wt%	1.305	0.487	0.665
9.0 wt%	1.169	0.482	0.659
11.7 wt%	1.128	0.482	0.654

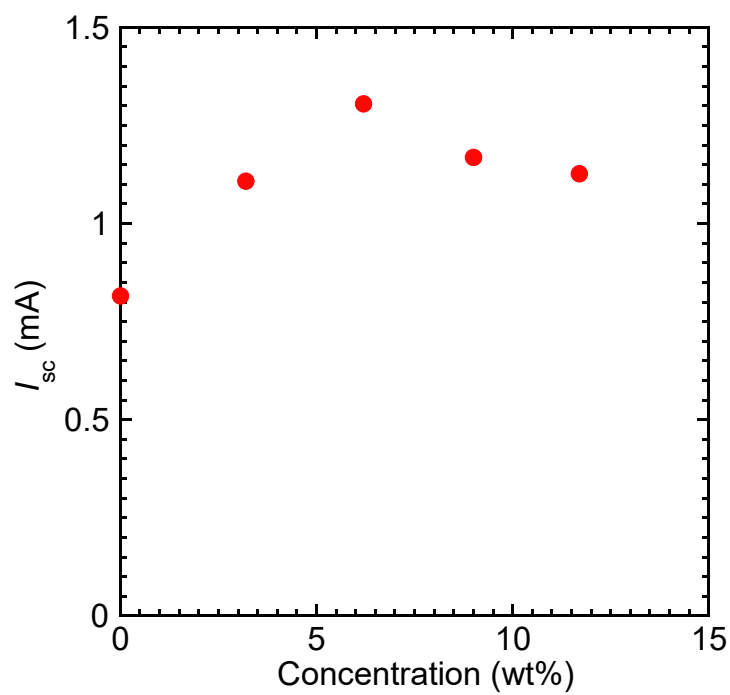


Fig. S8 Change in I_{sc} with increasing QD concentration from Fig. 3(A).

Table S3 Summary of the I - V curve measurements shown in Fig. 6(A).

Film sample	I_{sc} (mA)	V_{oc} (V)	FF
Without film	0.749	0.435	0.573
Blank EVA	0.806	0.442	0.587
79 μm	1.095	0.463	0.610
164 μm	1.120	0.464	0.613
233 μm	1.199	0.470	0.636
324 μm	1.281	0.473	0.626
373 μm	1.157	0.472	0.641

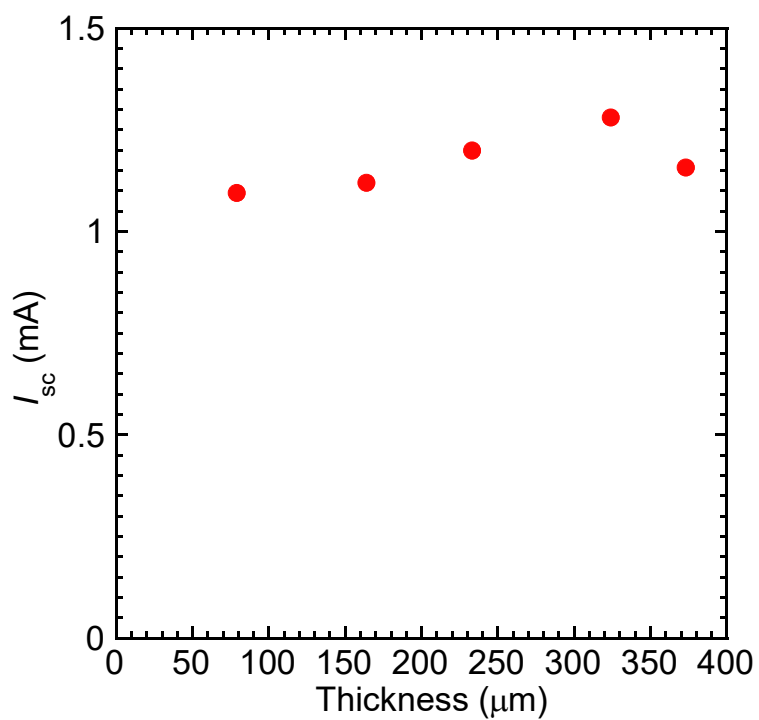


Fig. S9 Change in I_{sc} with increasing film thickness from Fig. 6(A).

Table S4 Summary of the I - V curve measurements shown in Fig. 7(A).

Light guide	Film sample	I_{sc} (mA)	V_{oc} (V)	FF
Soda glass	Blank EVA	0.806	0.442	0.587
	The optimized QDs@EVA	1.281	0.473	0.626
White glass	Blank EVA	2.651	0.506	0.664
	The optimized QDs@EVA	5.000	0.535	0.706

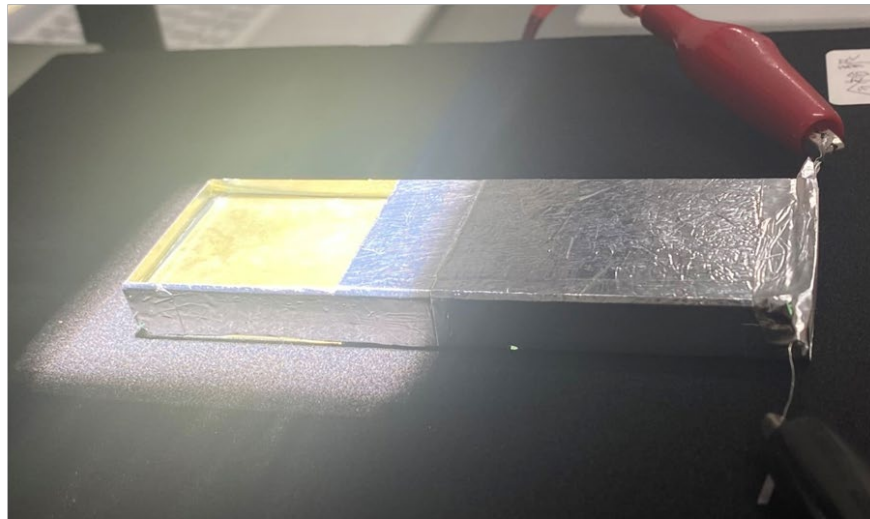
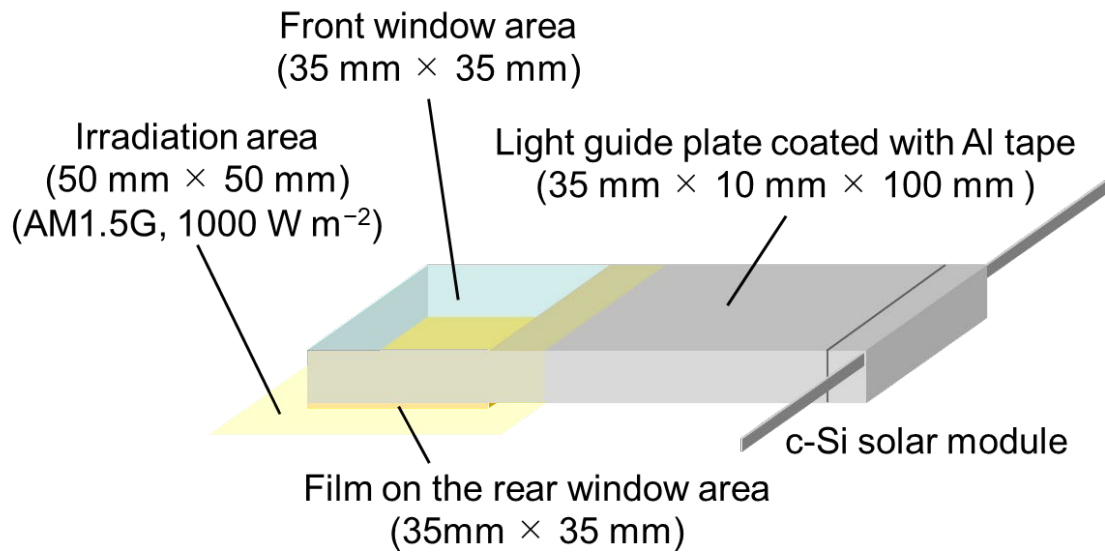


Fig. S10 Schematic illustration and photograph of the LSC which has front and rear windows. With the exception of the two windows, all areas are coated with aluminum tape. In these descriptions, a nanocomposite film is positioned on the rear side.

Table S5 Summary of the I - V curve measurements shown in Fig. 8(A).

Light guide material	Film position	I_{sc} (mA)	V_{oc} (V)	FF
Soda glass	Front side	0.614	0.451	0.628
	Rear side	0.685	0.456	0.638
White glass	Front side	1.923	0.503	0.695
	Rear side	2.006	0.507	0.698