Supporting Information

Comparing covalently-linked BODIPY-Pyrene system versus the correspondent physical mixture as chromophores in Luminescent Solar Concentrators

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Materials and methods

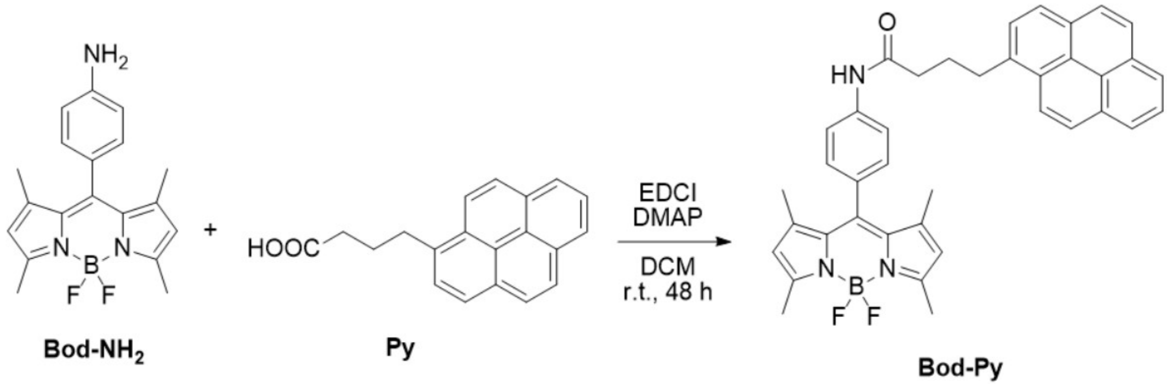
Chemicals

The solvents and chemicals were provided from commercial chemical suppliers (Merck) and used without further purification. Reactions were monitored by thin-layer chromatography (TLC) on silica gel 60 F254 aluminum plates. For purification, column chromatography was performed using 100–200 mesh silica gel. To fabricate the LSC, ethylene glycol dimethacrylate 98%, lauroyl peroxide for synthesis, and lauryl methacrylate 96% had been used, and all of them had been purchased from Sigma-Aldrich.

Instrumentation

To perform photophysical investigations in air-equilibrated dichloromethane solution at room temperature, quartz cuvettes with 1.0 cm path length were utilized. To measure UV/Vis absorption spectra both in liquid and in solid state, a Jasco V-560 spectrophotometer was used. A Jobin Yvon-Spex Fluoromax P spectrofluorimeter, equipped with a Hamamatsu R3896 photomultiplier, was used to perform the luminescence measurements. The emission spectra were corrected for the photomultiplier response using a program purchased with the fluorimeter. An Edinburgh OB 900 time-correlated single-photon-counting spectrometer was used, equipped with a Hamamatsu PLP 2 laser diode (59 ps pulse width at 408 nm) as excitation source was adopted to measure the luminescence lifetimes. Lifetimes uncertainties are about 10%, absorption spectra are registered with 2 nm of uncertain. The estimated experimental errors on the absorption and emission band maximum are 2 nm; on the molar absorption coefficient and luminescence lifetime is 5%, and on the luminescence quantum yield is 10%. All nuclear magnetic resonance spectra were recorded with Bruker Avance III 400 MHz and Varian 500 instruments using tetramethylsilane (TMS) as internal standard. Chemical shifts (δ) are given from TMS ($\delta = 0.00$) in parts per million (ppm) with reference to the residual nuclei of the deuterated solvent used [$CDCl_3$: ^{1}H NMR δ = 7.26 ppm (s); ^{13}C NMR δ = 77.0 ppm]. All ^{13}C NMR spectra were obtained with complete proton decoupling.

Synthesis and characterization of Bod-Py



Scheme S1. Synthetic procedure for the preparation of **Bod-Py**

Bod-NH₂ (94 mg, 0.2 mmol), 1-pyrenbutyric acid **Py** (80.73 mg, 0.28 mmol), N-(3-dimethylaminopropyl)-N′-ethyl carbodiimide EDCI (82.43 mg, 0.43 mmol), and dimethylamino-pyridine DMAP (4.0 mg, 0.03 mmol) were dissolved in anhydrous dichloromethane in Argon atmosphere. The reaction mixture was stirred at room temperature for 48 hours in an inert atmosphere. The organic phase was washed three times with deionized water, and after extraction, the dichloromethane solution was treated with anhydrous sodium sulfate. The solution was filtered and evaporated by roto-evaporation and the crude was purified by chromatographic column using silica as the fixed phase and dichloromethane as the mobile phase (R_f 0.60). The orange solid product **Bod-Py** was obtained with a yield of 79%. P.F. 231-238 °C.

IR (ATR, cm^{-1}): n 3381, 3038, 2923, 1694, 1506, 1372, 1305, 1157, 1046, 969, 837, 763, 706, 582.

^{1}H-NMR (500 MHz, $CDCl_3$): δ 8.34 (d, J=9.3 Hz, 1H), 8.16-8.17 (m, 2H), 8.12 (dd, J=11.0 Hz, J=7.8 Hz, 2H), 8.04 (s, 2H), 8.01 (t, J=7.6 Hz, 2H), 7.90 (d, J=7.8 Hz, 1H), 7.61 (d, J=8.5 Hz, 2H), 7.20 (d, J=8.5 Hz, 2H), 7.10 (s, 1H). 5.97 (s, 2H), 3.50 (t, J=7.5 Hz, 2H), 2.55 (s, 6H), 2.47 (t, J=7.5 Hz, 2H), 2.35 (m, 2H), 1.41 (s, 6H).

^{13}C-NMR (126 MHz, $CDCl_3$) δ 171.0, 155.4, 143.1, 141.2, 138.7, 135.5, 131.6, 131.4, 130.8, 130.4, 130.0, 128.8, 128.7, 127.5, 127.4, 127.4, 126.8, 125.9, 125.1, 125.0, 125.0, 124.8, 124.8, 123.3, 121.2, 119.8, 36.8, 32.5, 27.0, 14.6.

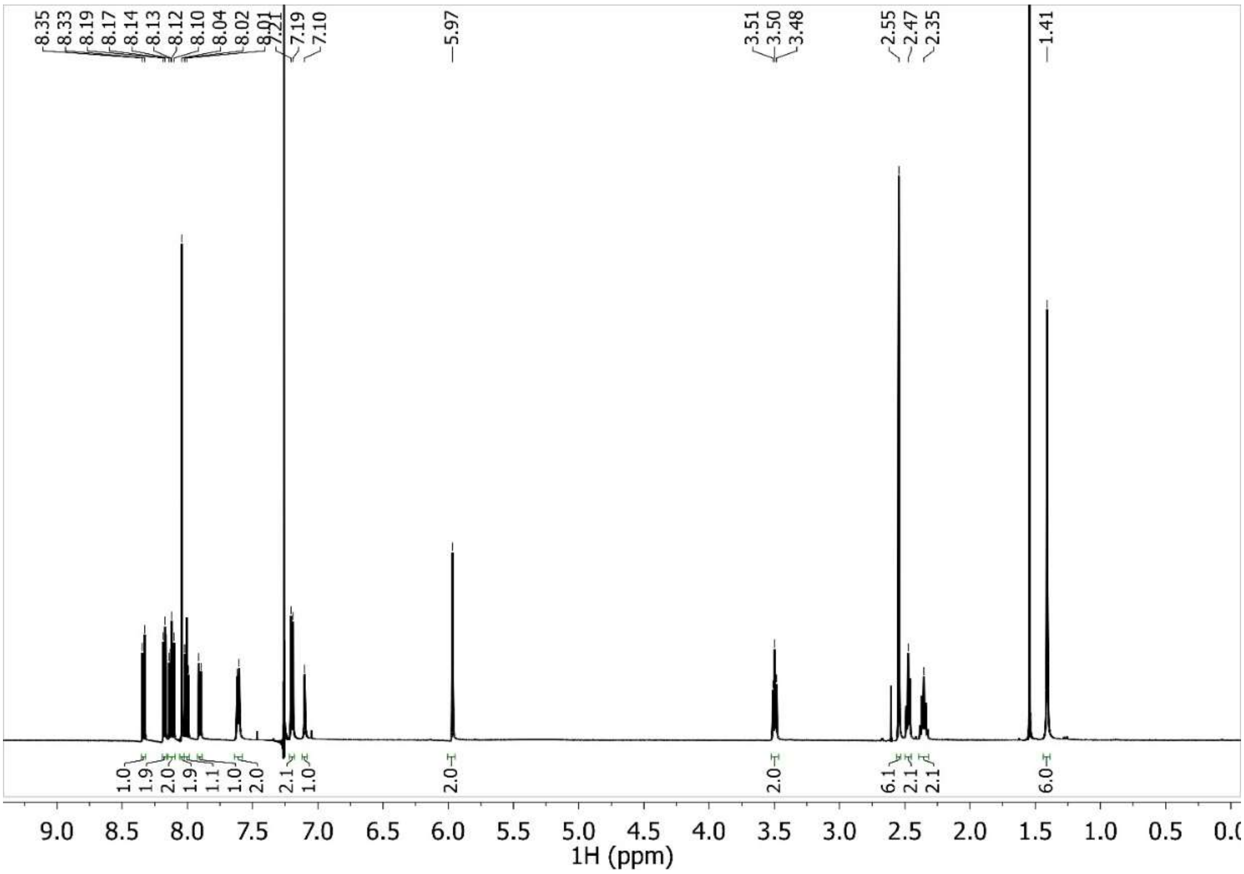


Figure S1: ^{1}H-NMR of **Bod-Py** in $CDCl_3$.

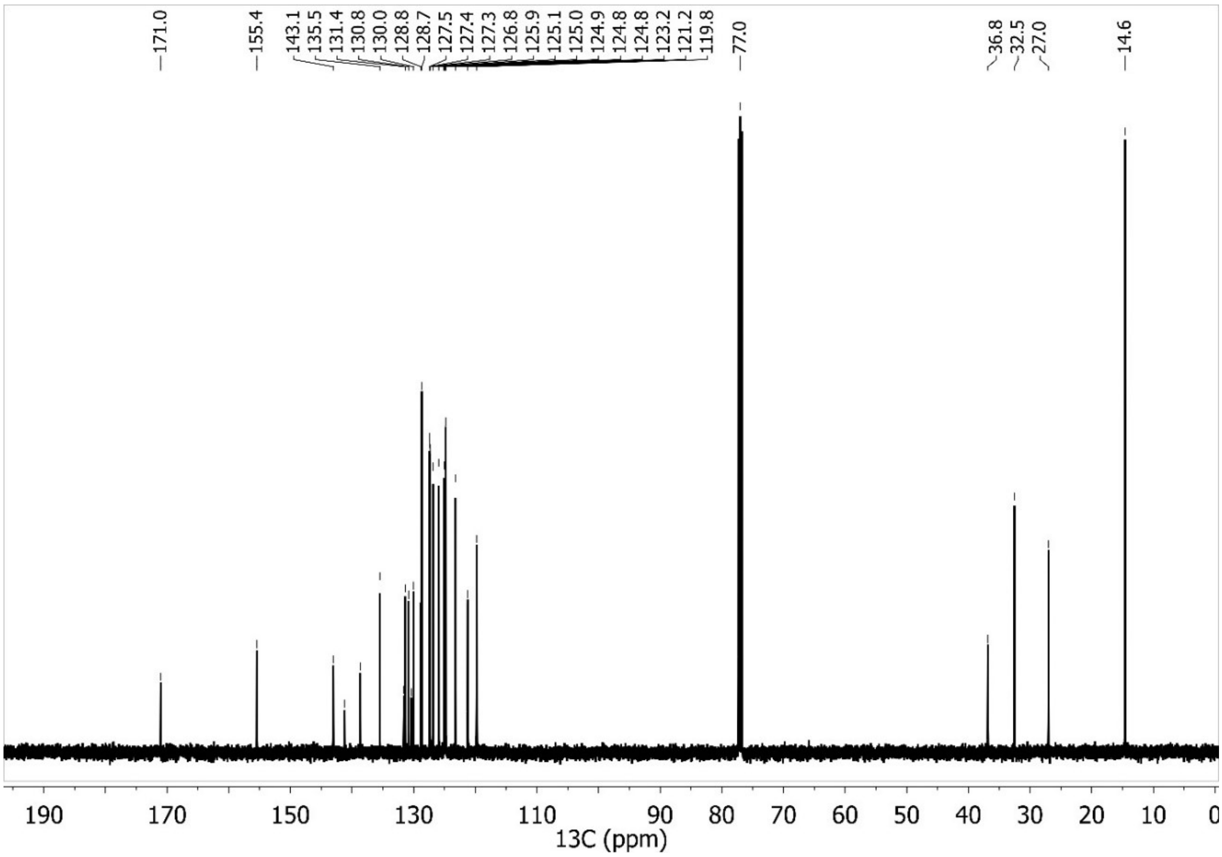


Figure S2. ^{13}C-NMR of **Bod-Py** in $CDCl_3$.

Absorption, emission and excitation spectra

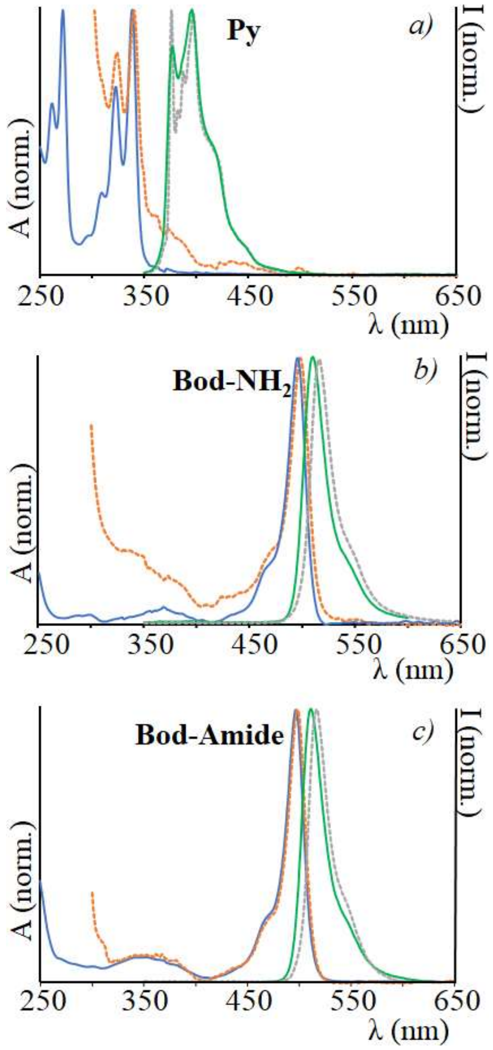


Figure S3. In Panels a), b) and c), Blue solid line: absorption spectra in DCM. Orange dashed line: absorption spectra in LSC. Green solid line: emission spectra in DCM, excitation wavelength: 350 nm. Grey dashed line: emission spectra in LSC, excitation wavelength: 350 nm.

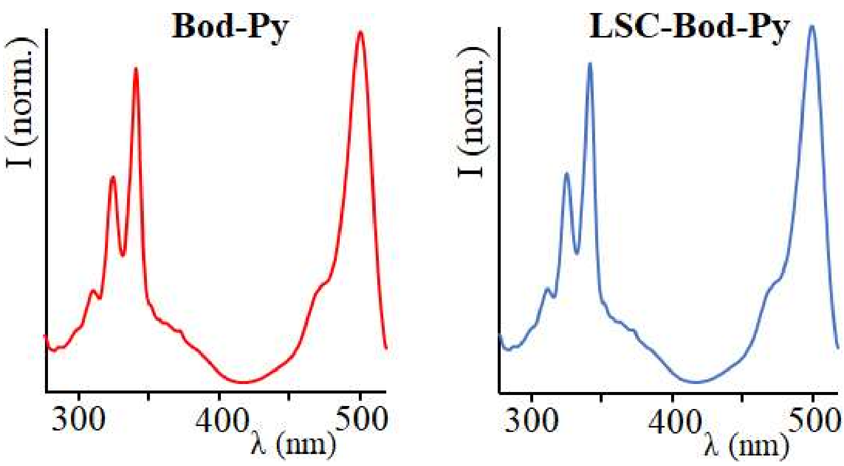


Figure S4. Excitation spectrum of **Bod-Py** in DCM solution (left side, red coloured) and in LSC (right side, blue coloured), at λ_{em} = 535 nm.

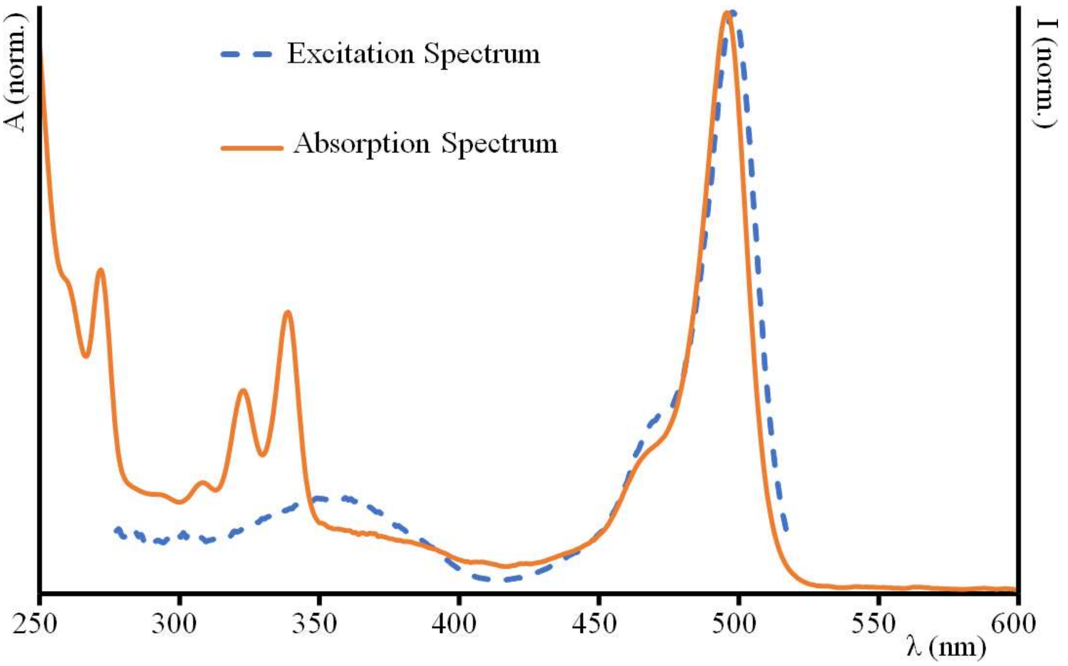


Figure S5. Absorption spectrum (orange line) and excitation spectrum at λ_{em} = 535 nm (blue dashed line) of **Mix** in DCM solution.

Fabrication of LSC

A thermal polymerization route was followed to prepare the luminescent solar concentrators. Lauryl methacrylate (LMA) acted as monomer, ethyl glycol dimethacrylate (EGDM) as cross-linking agent, and lauroyl peroxide as initiator. The ratio of these reagents was: LMA 65% w/w; EGDM 35% w/w; lauroyl peroxide 0.65% w/w with respect to LMA.[1, 2]

Before the reaction, LMA and EGDM were purified with basic activated alumina to remove the inhibitor of the polymerization, present in these reagents.

The initiator was dissolved directly into the monomer LMA and the mixture was heated at 80°C stirring under air condition. After 30 minutes, the temperature was cooled down and the cross-linking agent was added, keep stirring. Then, 2 x 10^{-8} mol of each chromophore had been introduced in the mixture; to prepare the so-called **Mix**, 2 x 10^{-8} mol of **Bod-Amide** and 2 x 10^{-8} mol of **Py** were mixed. The final liquid reaction mixture was left in the ultrasonic bath for 10 minutes in order to make it more homogeneous and then it was introduced into a "homemade" stamp, consisting in two small glasses separated by a teflon support having a hole to introduce the mixture. To transform the liquid phase into LSC solid matrix, the mixture was placed in an oven at 90°C for 40 minutes and the polymerization reaction started. The solid LSC slab was treated by sanding the surfaces and the edges to make it more smooth and to remove the external defects.

The same procedure was followed multiple times per each chromophores, using different concentrations.

Photovoltaic investigations

A solar simulator, consisting in a Xenon lamp with an AM 1.5 Global filter generating UV-vis light with the power intensity of 1 Sun (100 mW cm^{-2}), was used.[3] To measure the photocurrent, a Polycrystalline silicon photovoltaic panel V_{oc} = 0.55V, I_{sc} = 100 mA, was used and the short-circuit current intensity was measured with a digital multimeter Agilent 34401A.

One edge of the LSC was placed in direct contact with the silicon photovoltaic (PV) cell and irradiated perpendicularly by the solar simulator. The other 3 edges of the LSC were left uncovered. The PV panel was covered with a black tape, leaving uncovered only the portion necessary for the contact with the LSC.[4] The photovoltaic experiments had been performed on three LSCs of similar dimensions and containing the same concentrations of chromophores.

The G-factor is calculated according to Eq. S1:[5]

$$G = \frac{A\ top}{2A\ edge\ long + 2A\ edge\ short} = \frac{L\ x\ l}{2\ (L\ x\ t) + 2\ (l\ x\ t)} \qquad \textbf{Eq. S1}$$

where *t* is the thickness of the slab and *L* and *l* are the long and the short sides respectively, reported in **Table S1** for the blank and for each LSC fabricated.

Table S1. L, l and t of the prepared LSC; the G factor calculated according to **Eq. S1**; the area of the LSC in contact with the PV cell.

LSC	*L (cm)*	*l (cm)*	*t (cm)*	*G factor*	*Contact area (cm^2)*
Blank	1.90	1.83	0.36	1.29	0.66
Py	1.81	1.48	0.34	1.2	0.61
Bod-NH_2	1.89	1.74	0.33	1.37	0.62
Bod-Ammide	1.97	1.79	0.33	1.42	0.59
Bod-Py	1.93	1.79	0.33	1.41	0.59
Mix	1.88	1.65	0.32	1.37	0.53

The short-circuit current density, J, was calculated by diving the current intensity with the LSC/PV cell, I, with the contact area.

To calculate J_{PV} (mentioned in the manuscript) the current intensity of the PV cell (measured under direct illumination using the solar simulator) was divided by the exposed area of the panel (**Table S2**).

Table S2. Photovoltaic data related to the PV cell under direct illumination by the AM 1.5 G source.

I_{PV} (mA)	Area PV (cm^2)	J_{PV} (mA/cm^2)
14.90	0.94	15.85

Photocurrent measured by varying the optical path

A spot laser at λ = 406 nm was used as monochromatic source to irradiate a LSC placed on a platform which allowed to control the position of the laser spot on the slab surface.

Fraction of photons absorbed over the solar spectrum

A solar simulator (same type described in the sections above) was employed as irradiation source, and an optical fiber connected to a spectrometer Ocean Optics USB2000 was used to measure the solar spectrum with and without the LSC placed between the source and the detector.

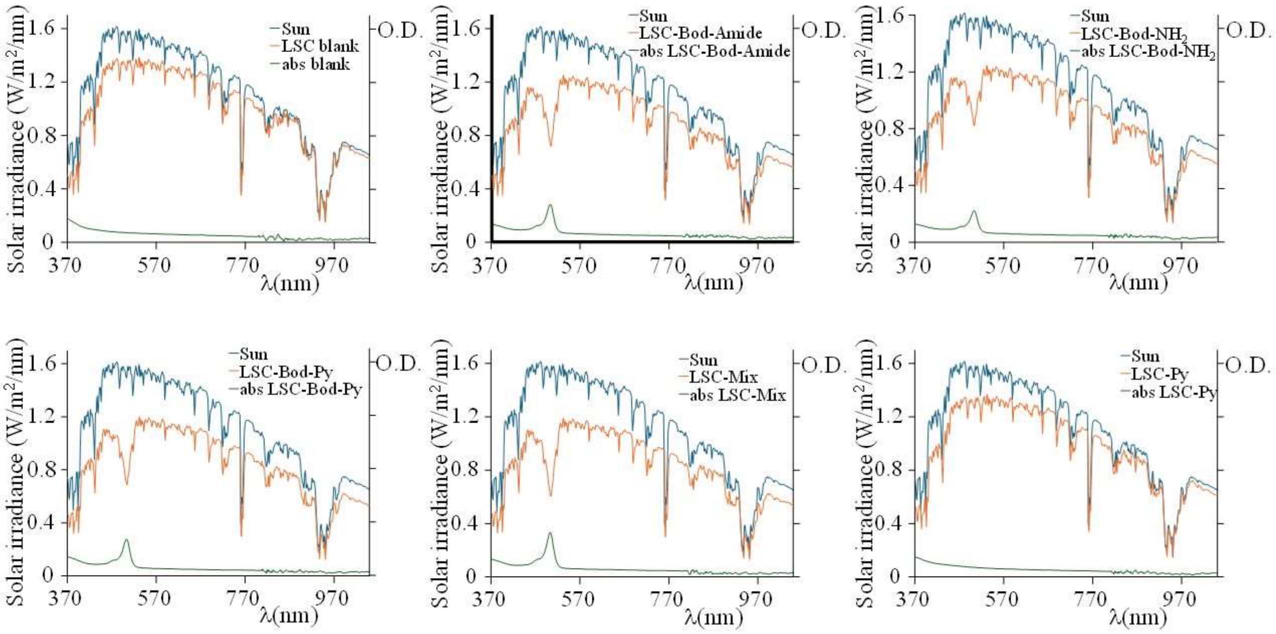


Figure S6. In each panel: in blue, the solar spectrum using the AM 1.5G filter; in green, the absorption spectrum; in orange, the solar spectrum filtered by the LSC.

Incident photon conversion efficiency (IPCE)

A Jobin Yvon-Spex Fluoromax P was used as spectrofluorimeter and the short-circuit current intensity was measured with a digital multimeter Agilent 34401A. To measure the optical power density of the irradiation source, the power meter (model 843-R equipped with a calibrated photodetector 818-SL, working in the range from 400 nm to 1100 nm) by Newport was utilized. In **Table S3** and **S4**, the current density J and the IPCE values are reported.

Table S3. Values of optical power density of the lamp and current density of the various LSC at different wavelenghts.

λ (nm)	P_{in} mW/cm^2	J blank (mA/cm^2)	J LSC-Py (mA/cm^2)	J LSC-Bod-NH2 (mA/cm^2)	J LSC-Bod-Amide (mA/cm^2)	J LSC-Bod-Py (mA/cm^2)	J LSC-Mix (mA/cm^2)
400	0.356	0.0005	0.0007	0.0011	0.0014	0.0017	0.0013
405	0.354	0.0004	0.0006	0.0010	0.0012	0.0014	0.0010
410	0.366	0.0004	0.0006	0.0009	0.0009	0.0013	0.0009
415	0.368	0.0005	0.0006	0.0010	0.0010	0.0013	0.0009
420	0.371	0.0005	0.0007	0.0010	0.0010	0.0014	0.0009
425	0.359	0.0005	0.0007	0.0010	0.0010	0.0015	0.0009
430	0.351	0.0005	0.0008	0.0011	0.0011	0.0017	0.0011
435	0.353	0.0005	0.0008	0.0013	0.0015	0.0019	0.0014
440	0.353	0.0006	0.0008	0.0015	0.0018	0.0023	0.0017
445	0.345	0.0006	0.0009	0.0018	0.0020	0.0026	0.0021
450	0.378	0.0006	0.0010	0.0022	0.0028	0.0033	0.0028
455	0.359	0.0006	0.0010	0.0026	0.0033	0.0038	0.0035
460	0.388	0.0006	0.0011	0.0036	0.0047	0.0053	0.0051
465	0.447	0.0007	0.0011	0.0053	0.0074	0.0082	0.0081
470	0.421	0.0007	0.0012	0.0066	0.0090	0.0099	0.0098
475	0.325	0.0005	0.0010	0.0059	0.0081	0.0086	0.0088
480	0.327	0.0007	0.0010	0.0064	0.0088	0.0093	0.0096
485	0.314	0.0005	0.0010	0.0077	0.0105	0.0110	0.0115
490	0.313	0.0005	0.0010	0.0106	0.0147	0.0153	0.0160
495	0.309	0.0005	0.0011	0.0149	0.0206	0.0210	0.0221
500	0.293	0.0005	0.0010	0.0186	0.0252	0.0258	0.0268
505	0.295	0.0005	0.0010	0.0182	0.0245	0.0253	0.0261
510	0.294	0.0005	0.0009	0.0123	0.0163	0.0171	0.0178
515	0.292	0.0005	0.0011	0.0064	0.0081	0.0088	0.0091
520	0.287	0.0005	0.0010	0.0030	0.0037	0.0043	0.0041
525	0.28	0.0005	0.0010	0.0018	0.0018	0.0025	0.0021
530	0.272	0.0005	0.0009	0.0012	0.0012	0.0013	0.0013
535	0.265	0.0005	0.0010	0.0010	0.0010	0.0010	0.0011
540	0.259	0.0005	0.0010	0.0009	0.0008	0.0009	0.0009
545	0.253	0.0005	0.0010	0.0008	0.0007	0.0008	0.0008
550	0.246	0.0004	0.0009	0.0008	0.0007	0.0007	0.0008
555	0.239	0.0004	0.0009	0.0007	0.0006	0.0007	0.0007
560	0.232	0.0004	0.0009	0.0007	0.0006	0.0006	0.0006
565	0.225	0.0004	0.0008	0.0007	0.0006	0.0007	0.0006
570	0.221	0.0004	0.0008	0.0007	0.0005	0.0007	0.0006
575	0.216	0.0004	0.0008	0.0006	0.0006	0.0008	0.0006
580	0.212	0.0004	0.0007	0.0006	0.0006	0.0007	0.0005
585	0.211	0.0004	0.0007	0.0006	0.0006	0.0007	0.0006
590	0.205	0.0003	0.0007	0.0006	0.0005	0.0006	0.0006
595	0.194	0.0003	0.0006	0.0006	0.0005	0.0006	0.0006
600	0.184	0.0003	0.0006	0.0005	0.0005	0.0006	0.0005
605	0.176	0.0003	0.0006	0.0005	0.0004	0.0005	0.0005
610	0.174	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005
615	0.177	0.0003	0.0006	0.0005	0.0004	0.0004	0.0005
620	0.179	0.0003	0.0006	0.0005	0.0005	0.0005	0.0004
625	0.167	0.0003	0.0006	0.0004	0.0004	0.0004	0.0005

630	0.156	0.0003	0.0005	0.0005	0.0004	0.0005	0.0004
635	0.144	0.0003	0.0005	0.0004	0.0004	0.0004	0.0004
640	0.141	0.0002	0.0005	0.0004	0.0004	0.0004	0.0004
645	0.16	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005
650	0.182	0.0003	0.0007	0.0005	0.0005	0.0005	0.0006

Table S4. IPCE values of the LSC at different wavelenghts.

λ (nm)	**IPCE (%) LSC-Py**	**IPCE (%) LSC-Bod-NH2**	**IPCE (%) LSC-Bod-Amide**	**IPCE (%) LSC-Bod-Py**	**IPCE (%) LSC-Mix**
400	0.1745	0.5892	0.8270	1.1219	0.7224
405	0.1268	0.5192	0.6558	0.8755	0.4906
410	0.1211	0.4385	0.4447	0.7385	0.4440
415	0.1466	0.4221	0.4275	0.7024	0.3216
420	0.1753	0.4276	0.4190	0.7423	0.3390
425	0.2275	0.4508	0.4692	0.8269	0.3948
430	0.2463	0.5559	0.5438	0.9889	0.5342
435	0.2129	0.6117	0.7603	1.1021	0.7051
440	0.1900	0.7769	0.9992	1.3641	0.9185
445	0.2526	0.9671	1.1872	1.6384	1.2651
450	0.2749	1.1919	1.6405	1.9984	1.6451
455	0.3430	1.5303	2.1054	2.4781	2.2444
460	0.3205	2.0691	2.8231	3.2818	3.1276
465	0.2864	2.7794	4.0543	4.5088	4.4579
470	0.3346	3.7097	5.2064	5.7369	5.7185
475	0.4004	4.3904	6.1069	6.5557	6.7301
480	0.2454	4.5510	6.4417	6.8162	7.0415
485	0.3565	5.8191	8.1260	8.5671	8.9248
490	0.4390	8.1805	11.5000	11.9517	12.5416
495	0.4478	11.6795	16.2552	16.6395	17.5488
500	0.4467	15.3173	20.9248	21.3977	22.2928
505	0.3975	14.7476	20.0024	20.6505	21.2550
510	0.3456	9.7270	13.0275	13.6855	14.2570
515	0.4844	4.8410	6.3000	6.8862	7.0983
520	0.4046	2.0059	2.6123	3.1047	2.9511
525	0.3565	1.0503	1.0798	1.6939	1.3040
530	0.4117	0.6569	0.6567	0.7004	0.7521
535	0.4616	0.4434	0.4191	0.4636	0.5081
540	0.4192	0.3279	0.2763	0.3514	0.3187
545	0.4347	0.3129	0.2163	0.3076	0.2780
550	0.4076	0.3426	0.2605	0.2605	0.3966
555	0.4485	0.3311	0.2324	0.2641	0.3321
560	0.4244	0.2737	0.1905	0.2228	0.2275
565	0.3562	0.2967	0.1782	0.3268	0.2179
570	0.4285	0.2779	0.1597	0.2930	0.2440
575	0.3751	0.2471	0.1958	0.4324	0.2027
580	0.3082	0.2014	0.1842	0.3037	0.1348
585	0.3574	0.1786	0.1800	0.3161	0.2340
590	0.3504	0.2647	0.1957	0.3172	0.2303

595	0.3407	0.2750	0.2032	0.3123	0.3026
600	0.3116	0.2092	0.1744	0.3075	0.2493
605	0.2945	0.1941	0.1590	0.2773	0.2379
610	0.2190	0.2025	0.1459	0.1459	0.1958
615	0.3679	0.2442	0.1902	0.1902	0.2775
620	0.2878	0.2081	0.1546	0.1735	0.1311
625	0.3184	0.1746	0.1199	0.1803	0.2394
630	0.2880	0.2294	0.1487	0.2128	0.1788
635	0.2968	0.2169	0.1322	0.1781	0.2050
640	0.3490	0.1928	0.2013	0.2246	0.2451
645	0.2504	0.2812	0.2027	0.3044	0.2780
650	0.3533	0.1953	0.2160	0.2160	0.3110

AVT, CRI and LAB calculation

Color rendering index (CRI) and Chromaticity Coordinates have been calculated by using the calculator provided in the Supporting Information of the scientific paper: C. Yang, D. Liu, M. Bates, M. C. Barr, R. R. Lunt, "How to Accurately Test, Characterize, and Report Transparent Solar Cells", *Joule,* **2019**, *3,* 1803-1809. Analogously, Average visible transmission (AVT) and color coordinates (LAB) were calculated as well and reported below.[6]

LSC-Blank		
Tristimulus Values	AM 1.5G norm.	AM 1.5G*T(λ) norm.
X	96.6	96.6
Y	100.0	100.0
Z	94.2	89.8
Chromaticity Coordinates	AM 1.5G	AM 1.5G*T(λ)
x	0.332	0.337
y	0.344	0.349
z	0.324	0.314
u	0.206	0.207
v	0.319	0.322
Uniform Chromaticity Coordinatee (CIELu'v' 1976)	AM 1.5G	AM 1.5G*T(λ)
u'	0.206	0.207
v'	0.479	0.482
CCT estimated (K)	5513	5302
Minimum Chromaticity Distance in CIE1976 (u', v')	0.0004	0.0016
Minimum Chromaticity Distance in CIE1960 (u, v)	0.0004	0.0012
Planckian Limit	0.0025	
CRI	**96.40**	
AVT%	**80.28**	
CIELa*b* Coordinates	AM 1.5G ref	AM 1.5G*T(λ) test
X	96.6	77.5
Y	100.0	80.2
Z	94.2	72.1
f(Xtest/Xref)	1.00	0.93
f(Ytest/Yref)	1.00	0.93
f(Ztest/Zref)	1.00	0.91
L*	100.0	91.8
a*	**0.0000**	**0.04**
b*	**0.0000**	**2.94**

LSC-Py		
Tristimulus Values	AM 1.5G norm.	AM 1.5G*T(λ) norm.
X	96.6	96.6
Y	100.0	100.0
Z	94.2	89.3
Chromaticity Coordinates	AM 1.5G	AM 1.5G*T(λ)
x	0.332	0.338
y	0.344	0.350
z	0.324	0.312
u	0.206	0.207
v	0.319	0.322
Uniform Chromaticity Coordinatee (CIELu'v' 1976)	AM 1.5G	AM 1.5G*T(λ)
u'	0.206	0.207
v'	0.479	0.483
CCT estimated (K)	5513	5276
Minimum Chromaticity Distance in CIE1976 (u', v')	0.0004	0.0018
Minimum Chromaticity Distance in CIE1960 (u, v)	0.0004	0.0013
Planckian Limit	0.0025	
CRI	**96.05**	
AVT%	**82.38**	
CIELa*b* Coordinates	AM 1.5G ref	AM 1.5G*T(λ) test
X	96.6	79.6
Y	100.0	82.3
Z	94.2	73.5
f(Xtest/Xref)	1.00	0.94
f(Ytest/Yref)	1.00	0.94
f(Ztest/Zref)	1.00	0.92
L*	100.0	92.7
a*	**0.0000**	**0.06**
b*	**0.0000**	**3.34**

LSC-Bod-NH_2		
Tristimulus Values	AM 1.5G norm.	AM 1.5G*T(λ) norm.
X	96.6	98.7
Y	100.0	100.0
Z	94.2	88.3
Chromaticity Coordinates	AM 1.5G	AM 1.5G*T(λ)
x	0.332	0.344
y	0.344	0.348
z	0.324	0.308
u	0.206	0.212
v	0.319	0.322
Uniform Chromaticity Coordinatee (CIELu'v' 1976)	AM 1.5G	AM 1.5G*T(λ)
u'	0.206	0.212
v'	0.479	0.483
CCT estimated (K)	5513	5035
Minimum Chromaticity Distance in CIE1976 (u', v')	0.0004	0.0031
Minimum Chromaticity Distance in CIE1960 (u, v)	0.0004	0.0029
Planckian Limit	0.0025	
CRI	**94.45**	
AVT%	**81.93**	
CIELa*b* Coordinates	AM 1.5G ref	AM 1.5G*T(λ) test
X	96.6	80.7
Y	100.0	81.7
Z	94.2	72.1
f(Xtest/Xref)	1.00	0.94
f(Ytest/Yref)	1.00	0.93
f(Ztest/Zref)	1.00	0.91
L*	100.0	92.4
a*	**0.0000**	**3.43**
b*	**0.0000**	**4.02**

LSC-Bod-Amide		
Tristimulus Values	AM 1.5G norm.	AM 1.5G*T(λ) norm.
X	96.6	99.5
Y	100.0	100.0
Z	94.2	87.8
Chromaticity Coordinates	AM 1.5G	AM 1.5G*T(λ)
x	0.332	0.346
y	0.344	0.348
z	0.324	0.306
u	0.206	0.214
v	0.319	0.322
Uniform Chromaticity Coordinatee (CIELu'v' 1976)	AM 1.5G	AM 1.5G*T(λ)
u'	0.206	0.214
v'	0.479	0.483
CCT estimated (K)	5513	4948
Minimum Chromaticity Distance in CIE1976 (u', v')	0.0004	0.0047
Minimum Chromaticity Distance in CIE1960 (u, v)	0.0004	0.0037
Planckian Limit	0.0025	
CRI	**93.03**	
AVT%	**80.59**	
CIELa*b* Coordinates	AM 1.5G ref	AM 1.5G*T(λ) test
X	96.6	79.9
Y	100.0	80.3
Z	94.2	70.5
f(Xtest/Xref)	1.00	0.94
f(Ytest/Yref)	1.00	0.93
f(Ztest/Zref)	1.00	0.91
L*	100.0	91.8
a*	**0.0000**	**4.59**
b*	**0.0000**	**4.28**

LSC-Bod-Py		
Tristimulus Values	AM 1.5G norm.	AM 1.5G*T(λ) norm.
X	96.6	99.4
Y	100.0	100.0
Z	94.2	87.5
Chromaticity Coordinates	AM 1.5G	AM 1.5G*T(λ)
x	0.332	0.346
y	0.344	0.349
z	0.324	0.305
u	0.206	0.213
v	0.319	0.322
Uniform Chromaticity Coordinatee (CIELu'v' 1976)	AM 1.5G	AM 1.5G*T(λ)
u'	0.206	0.213
v'	0.479	0.483
CCT estimated (K)	5513	4944
Minimum Chromaticity Distance in CIE1976 (u', v')	0.0004	0.0044
Minimum Chromaticity Distance in CIE1960 (u, v)	0.0004	0.0035
Planckian Limit	0.0025	
CRI	**93.04**	
AVT%	**80.55**	
CIELa*b* Coordinates	AM 1.5G ref	AM 1.5G*T(λ) test
X	96.6	79.7
Y	100.0	80.3
Z	94.2	70.2
f(Xtest/Xref)	1.00	0.94
f(Ytest/Yref)	1.00	0.93
f(Ztest/Zref)	1.00	0.91
L*	100.0	91.8
a*	**0.0000**	**4.40**
b*	**0.0000**	**4.52**

LSC-Mix		
Tristimulus Values	AM 1.5G norm.	AM 1.5G*T(λ) norm.
X	96.6	100.0
Y	100.0	100.0
Z	94.2	87.6
Chromaticity Coordinates	AM 1.5G	AM 1.5G*T(λ)
x	0.332	0.348
y	0.344	0.348
z	0.324	0.305
u	0.206	0.215
v	0.319	0.322
Uniform Chromaticity Coordinatee (CIELu'v' 1976)	AM 1.5G	AM 1.5G*T(λ)
u'	0.206	0.215
v'	0.479	0.483
CCT estimated (K)	5513	4890
Minimum Chromaticity Distance in CIE1976 (u', v')	0.0004	0.0054
Minimum Chromaticity Distance in CIE1960 (u, v)	0.0004	0.0046
Planckian Limit	0.0025	
CRI	**91.98**	
AVT%	**78.59**	
CIELa*b* Coordinates	AM 1.5G ref	AM 1.5G*T(λ) test
X	96.6	78.3
Y	100.0	78.2
Z	94.2	68.6
f(Xtest/Xref)	1.00	0.93
f(Ytest/Yref)	1.00	0.92
f(Ztest/Zref)	1.00	0.90
L*	100.0	90.9
a*	**0.0000**	**5.38**
b*	**0.0000**	**4.40**

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