

## **Supporting Information**

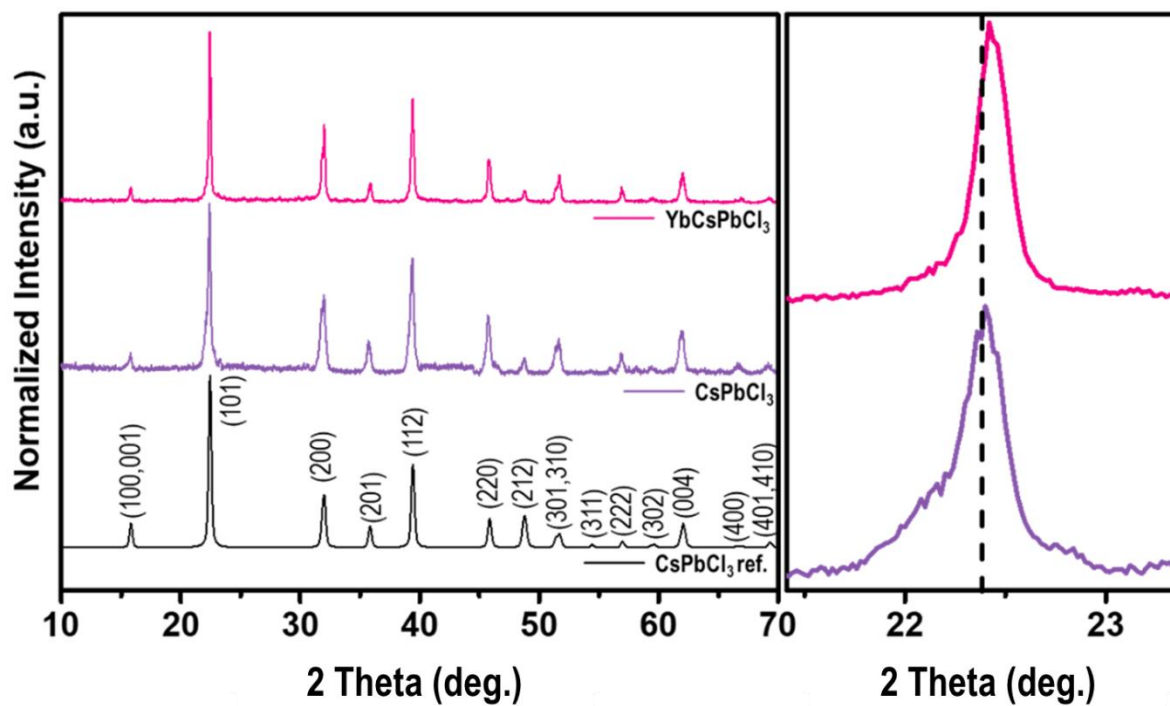
# **A Highly Transparent and Efficient Luminescent Solar Concentrator Based on Nanosized Molybdenum Clusters and Quantum-Cutting Perovskite Nanocrystals**

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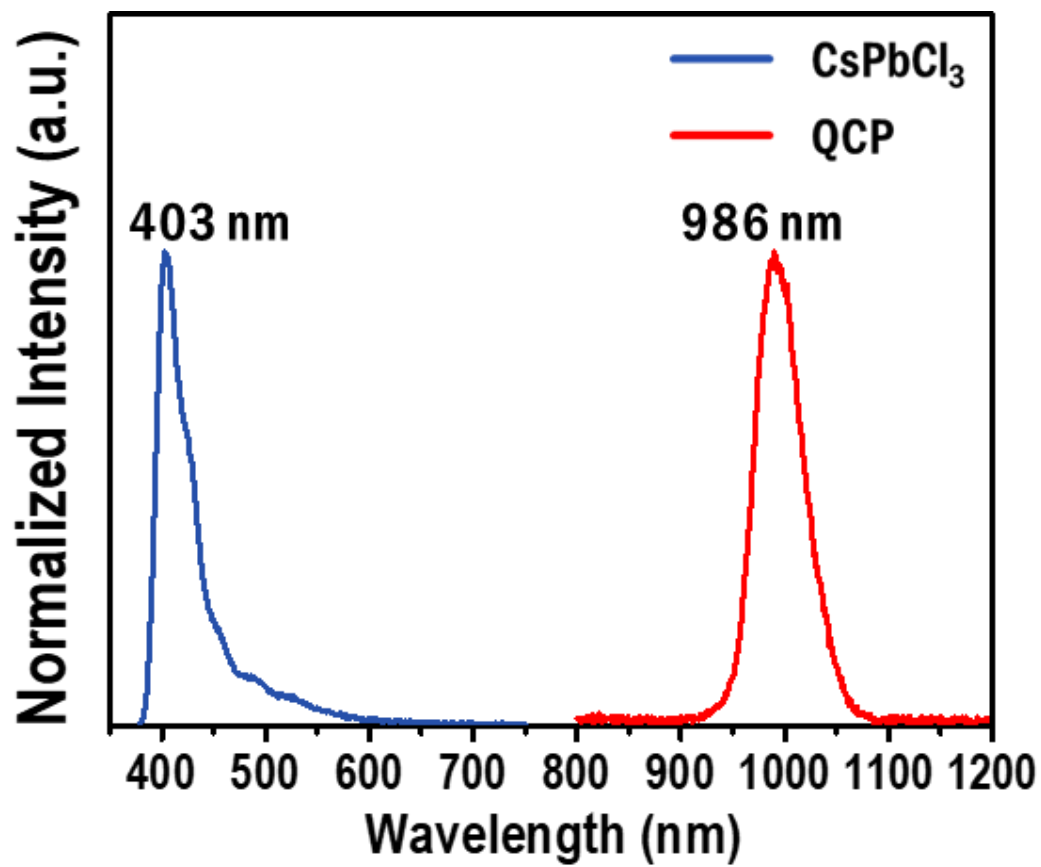
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**Figure S1.** XRD patterns of QCP (top, pink) and undoped-CsPbCl<sub>3</sub> (middle, purple). The reference peak of CsPbCl<sub>3</sub> perovskite is also presented (bottom, black)



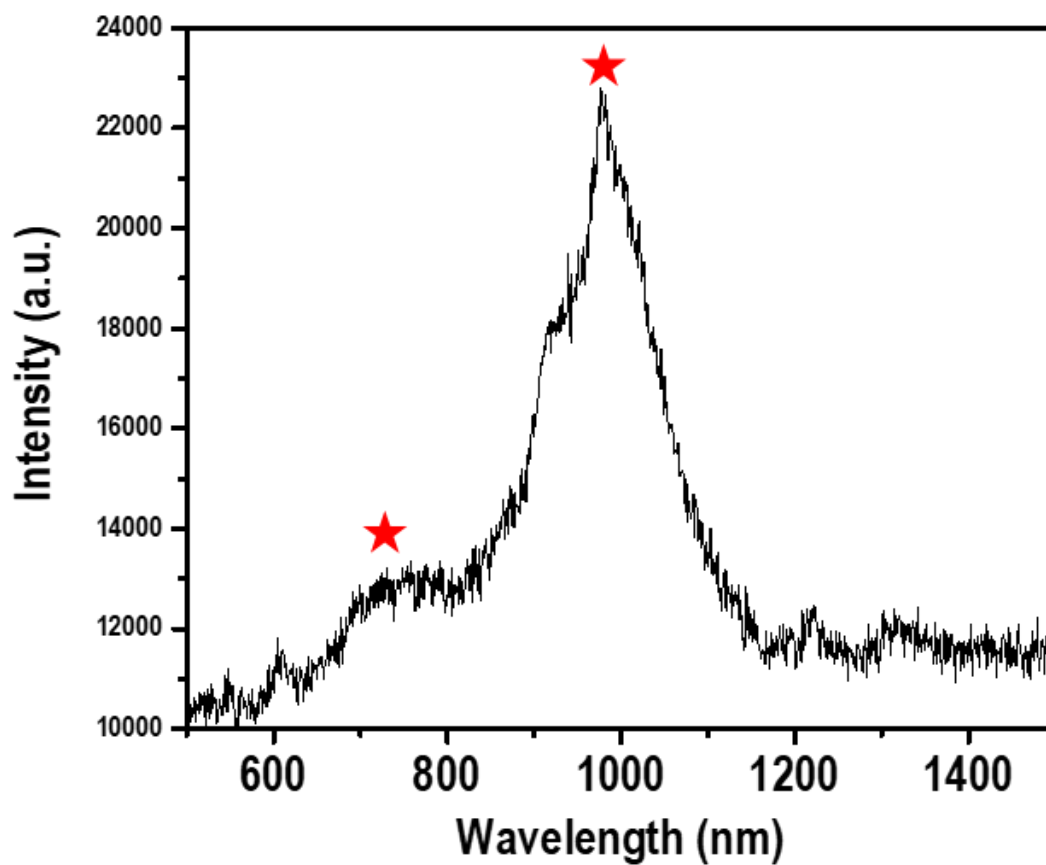
**Figure S2.** Normalized PL spectra of CsPbCl<sub>3</sub> (blue) at 403 nm and QCP (red) at 986 nm excited with a 345 nm light source.

**Table S1.** AVT and color coordinates of the prepared LSCs calculated using the CIE 1931 chromaticity diagram.

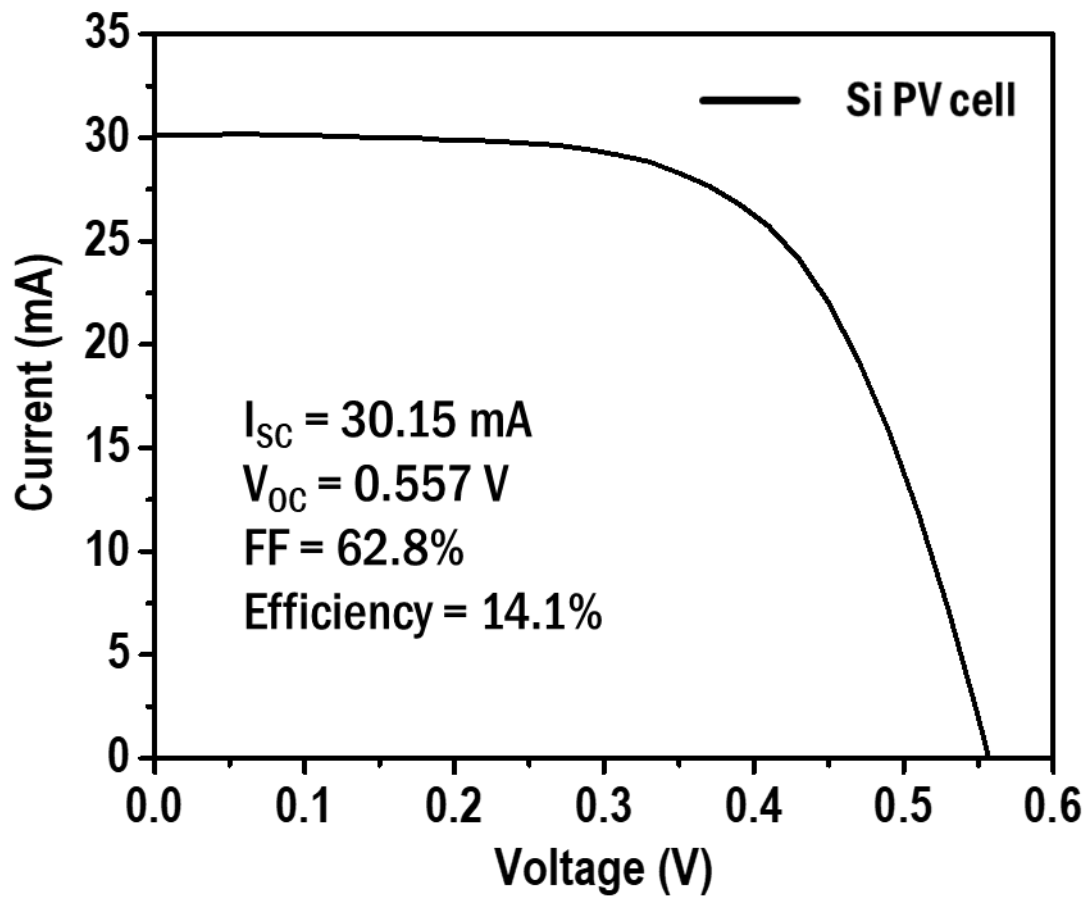
MoC+QCP wt% ratio	AVT	x	y
0.2:0 wt%	84.9	0.3349	0.3352
0.2:0.04 wt%	81.5	0.3355	0.3356
0.2:0.1 wt%	80.0	0.3356	0.3357
0.2:0.2 wt%	77.4	0.3389	0.3394
0.2:0.45wt%	74.6	0.3435	0.3448
0.2:0.6 wt%	67.9	0.3559	0.357

**Table S2.** Summary of PLQYs for molybdenum clusters, MoC, CsPbCl<sub>3</sub>, QCP, and MoC+QCP with an excitation wavelength of 375 nm.

Sample No.	QY (%) ( $\lambda_{ex}=375$ nm)			
	300-600 nm	600-900 nm	900-1200 nm	Total QY (%)
Cs <sub>2</sub> Mo <sub>6</sub> I <sub>14</sub> (0.2 wt%)	-	1	-	1
MoC (0.2 wt%)	2	29	-	31
CsPbCl <sub>3</sub> (0.1 wt%)	8.3	-	-	8.3
QCP (0.3 wt%)	0.9	-	109.9	110.8
MoC+QCP (0.2:0.1 wt%)	3.2	25	64.2	92.4



**Figure S3.** PL spectra of MoC+QCP at a ratio of 0.2:0.1 (by wt%) with an excitation wavelength of 375 nm.



**Figure S4.** Current-voltage ( $I$ - $V$ ) curve of the Si PV cell with an average PCE of  $14 \pm 0.19\%$  (1 sun, AM 1.5 G).

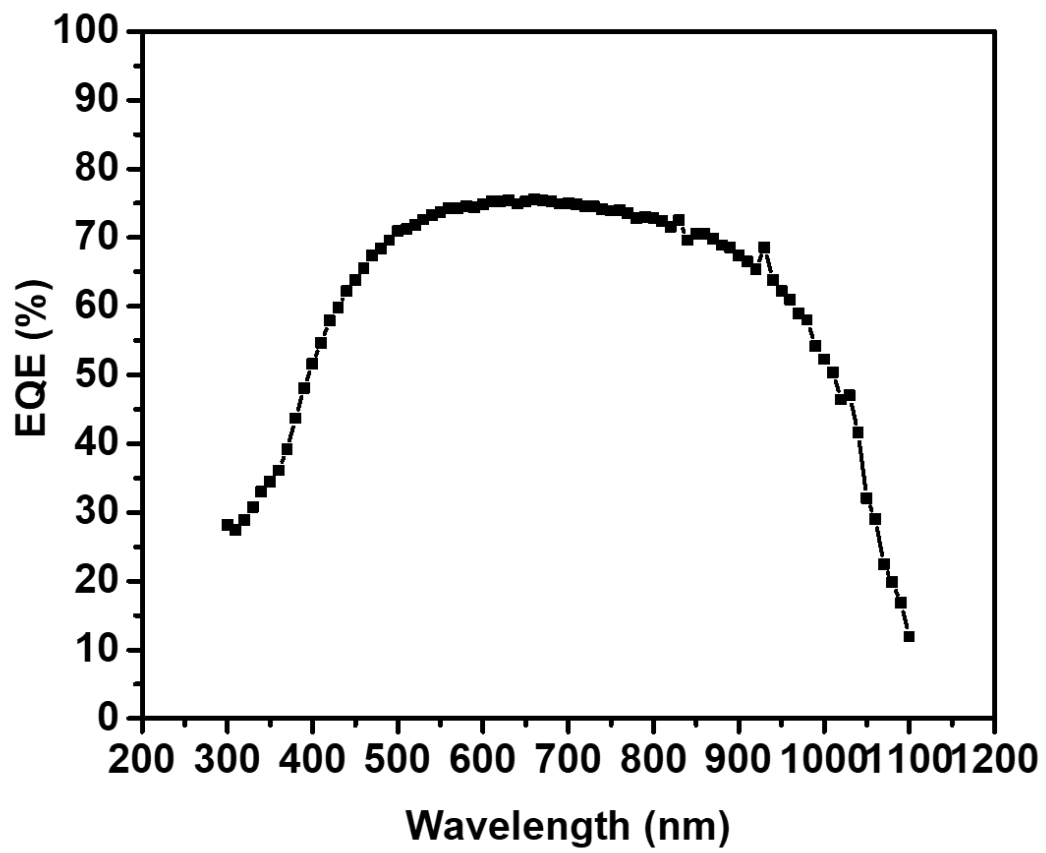
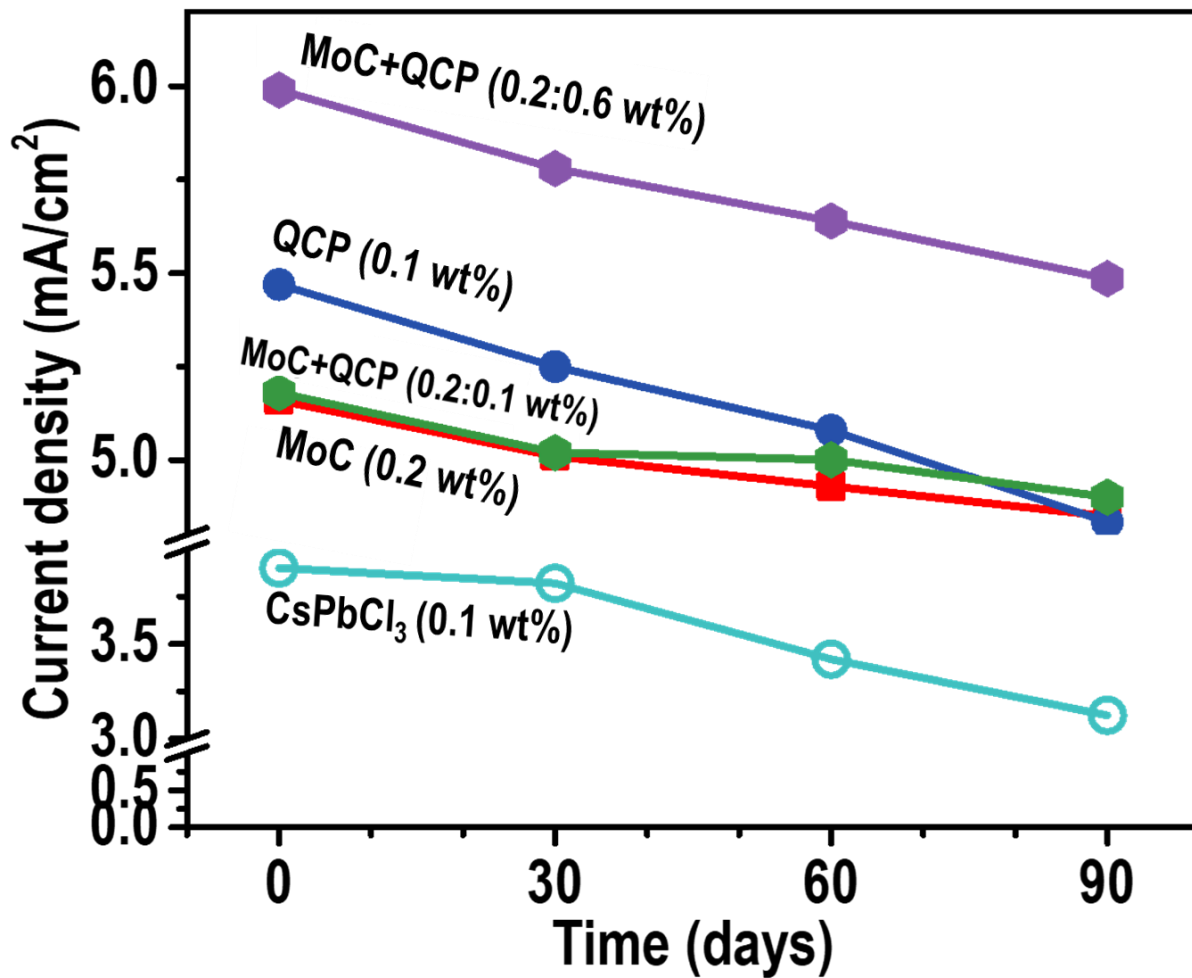


Figure S5. EQE spectra of Si PV cells.





**Figure S6.** Graph of current densities of CsPbCl<sub>3</sub> (cyan circles), MoC (red squares), QCP (blue circles), MoC+QCP (0.2:0.1 wt%) (green hexagons), and MoC+QCP (0.2:0.6 wt%) (purple hexagons) dye-based LSC devices under solar simulator illumination (AM 1.5G) as a function of time up to 90 days.