Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Perovskite and Quantum Dot Tandem Solar Cells with Interlayer Modification for Improved Optical Semitransparency and Stability

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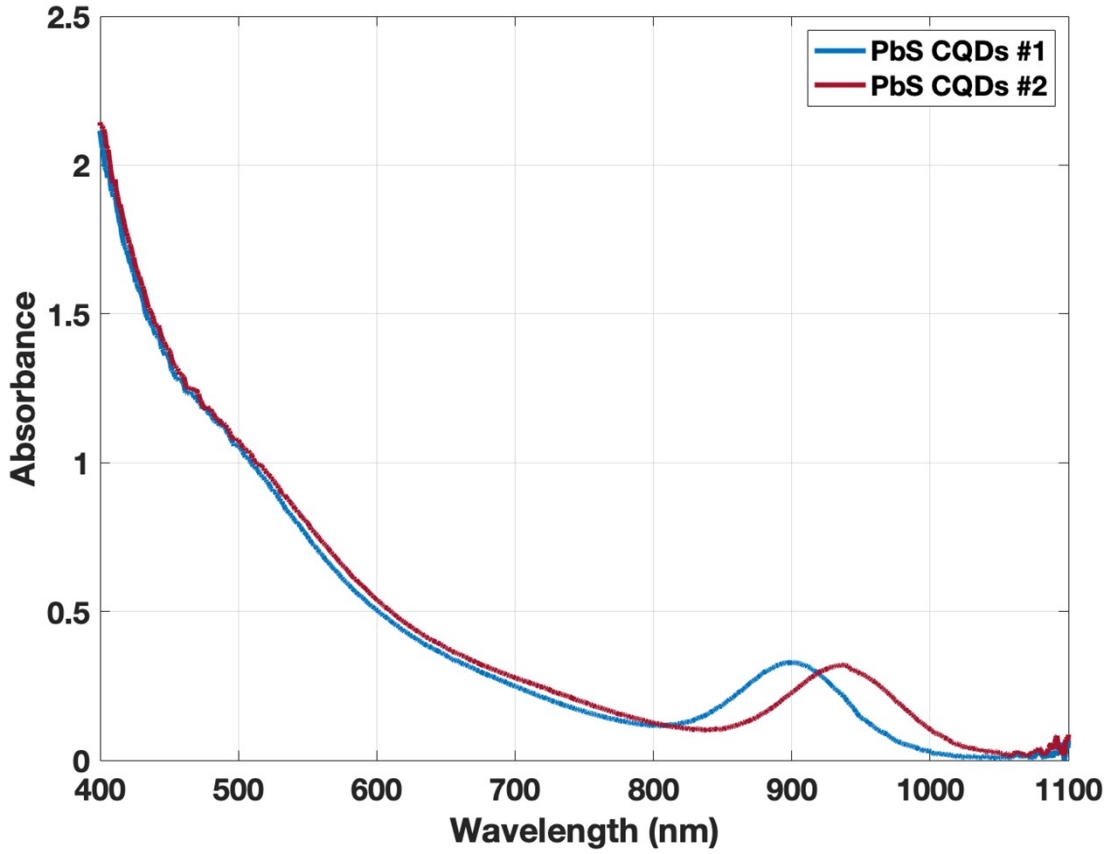


Figure S1. *UV-Vis-NIR absorbance spectrum of PbS CQDs #1 and #2 solutions, where λ_{max} was 901 and 935 nm respectively.*

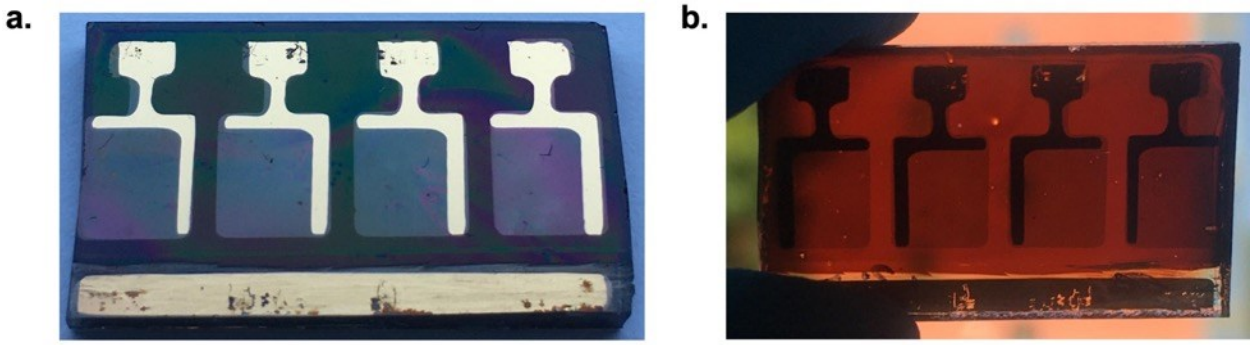


Figure S2. *Picture of the $MAPbI_3$ semi-transparent solar cell with patterned design of Au electrode: (a) top view and (b) cross view. The size of presented solar cells is 2.4x1.4 cm.*

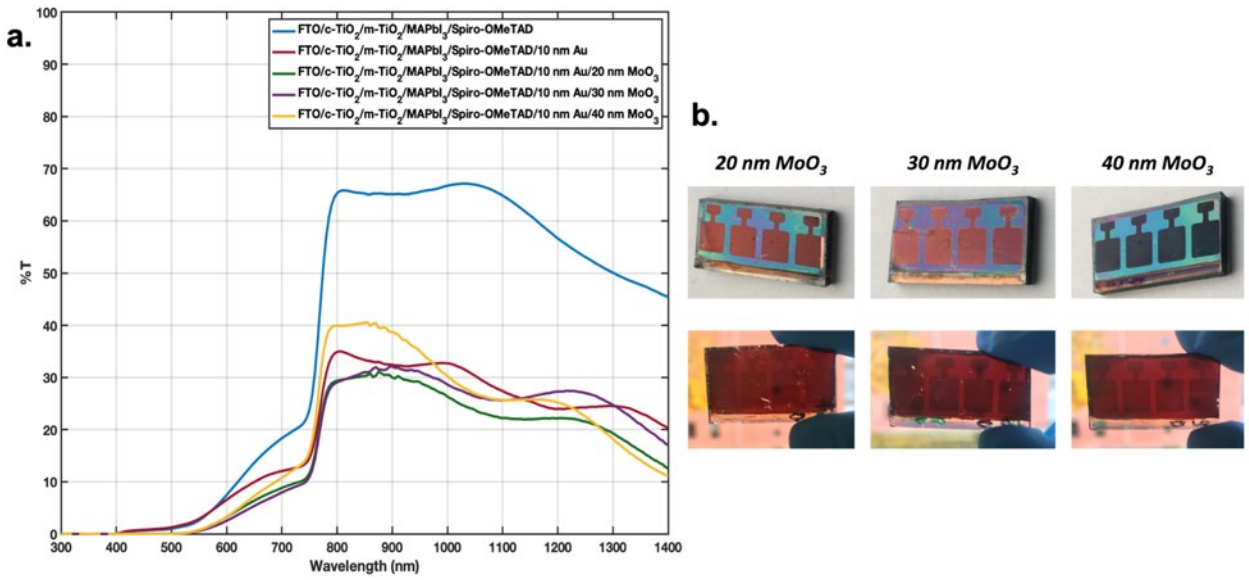
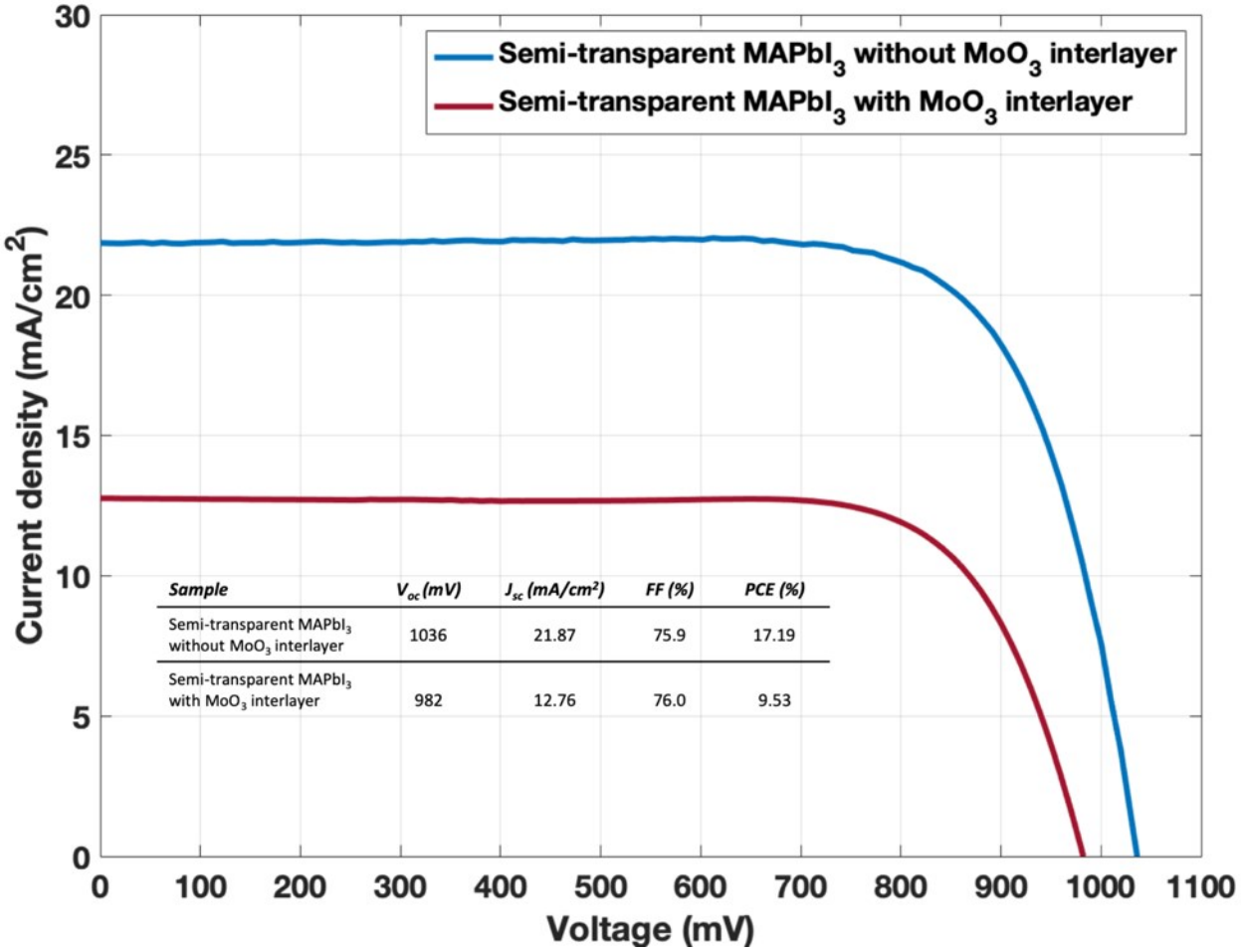


Figure S3. (a) *Transmittance spectrum of the perovskite solar cell with the following structure: FTO glass/compact TiO_2/mesoporous TiO_2/$MAPbI_3$ perovskite/Spiro-OMeTAD/10nm Au with different thicknesses of MoO_3 layer on top.* ***(b)*** *Pictures of the semi-transparent $MAPbI_3$ solar cells with 10 nm Au electrode and different thicknesses of MoO_3 on top of it: top and through views. The size of presented solar cells is 2.4x1.4 cm.*



Sample	V_{oc} (mV)	J_{sc} (mA/cm²)	FF (%)	PCE (%)
Semi-transparent $MAPbI_3$ without MoO_3 interlayer	1036	21.87	75.9	17.19
Semi-transparent $MAPbI_3$ with MoO_3 interlayer	982	12.76	76.0	9.53

Figure S4. *Current-voltage measurements of the semi-transparent $MAPbI_3$ solar cell with 10 nm Au electrode (blue line) and with 10 nm Au electrode followed by 20 nm MoO_3 interlayer (red line).*

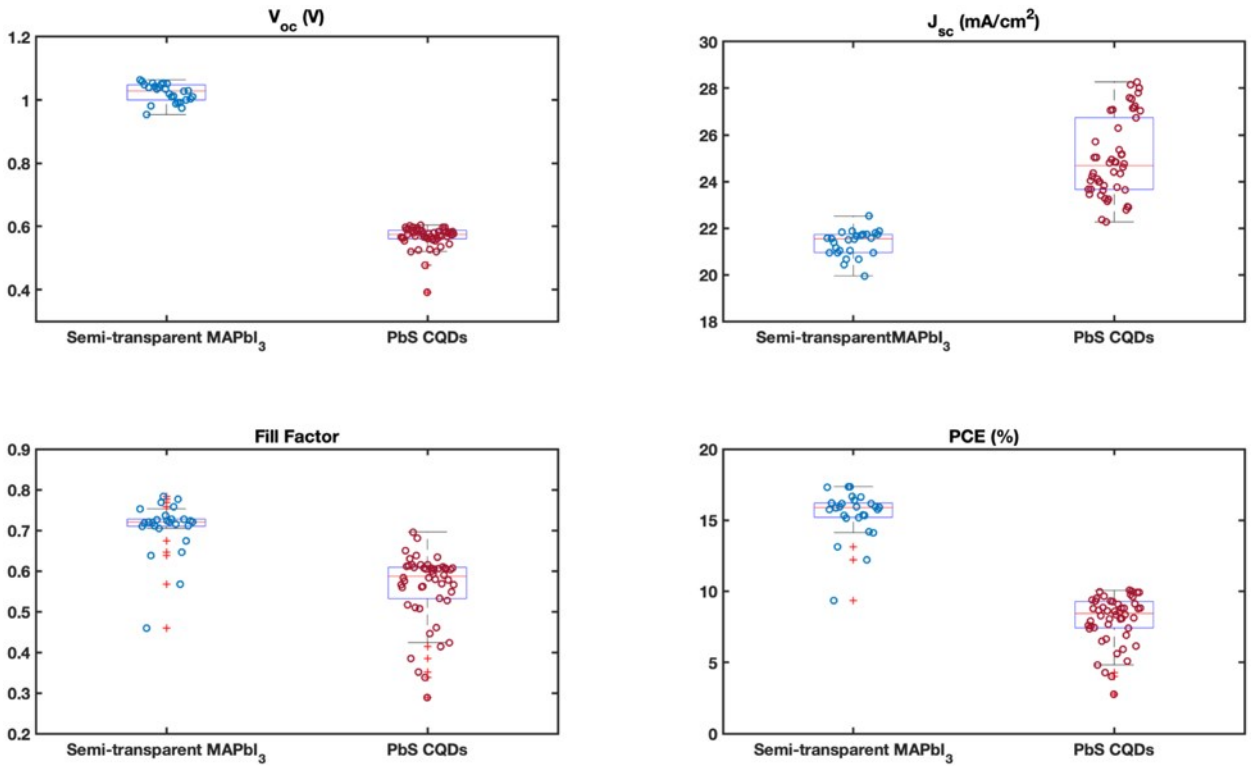


Figure S5. *Current-voltage (JV) measurements statistics for semi-transparent $MAPbI_3$ solar cells with 10 nm Au electrode (blue) and PbS colloidal quantum dots solar cells of both λ_{max}=901 nm and λ_{max}=935 nm (red). For the semi-transparent $MAPbI_3$ statistics 26 samples were used and for PbS CQD solar cell 50 samples.*

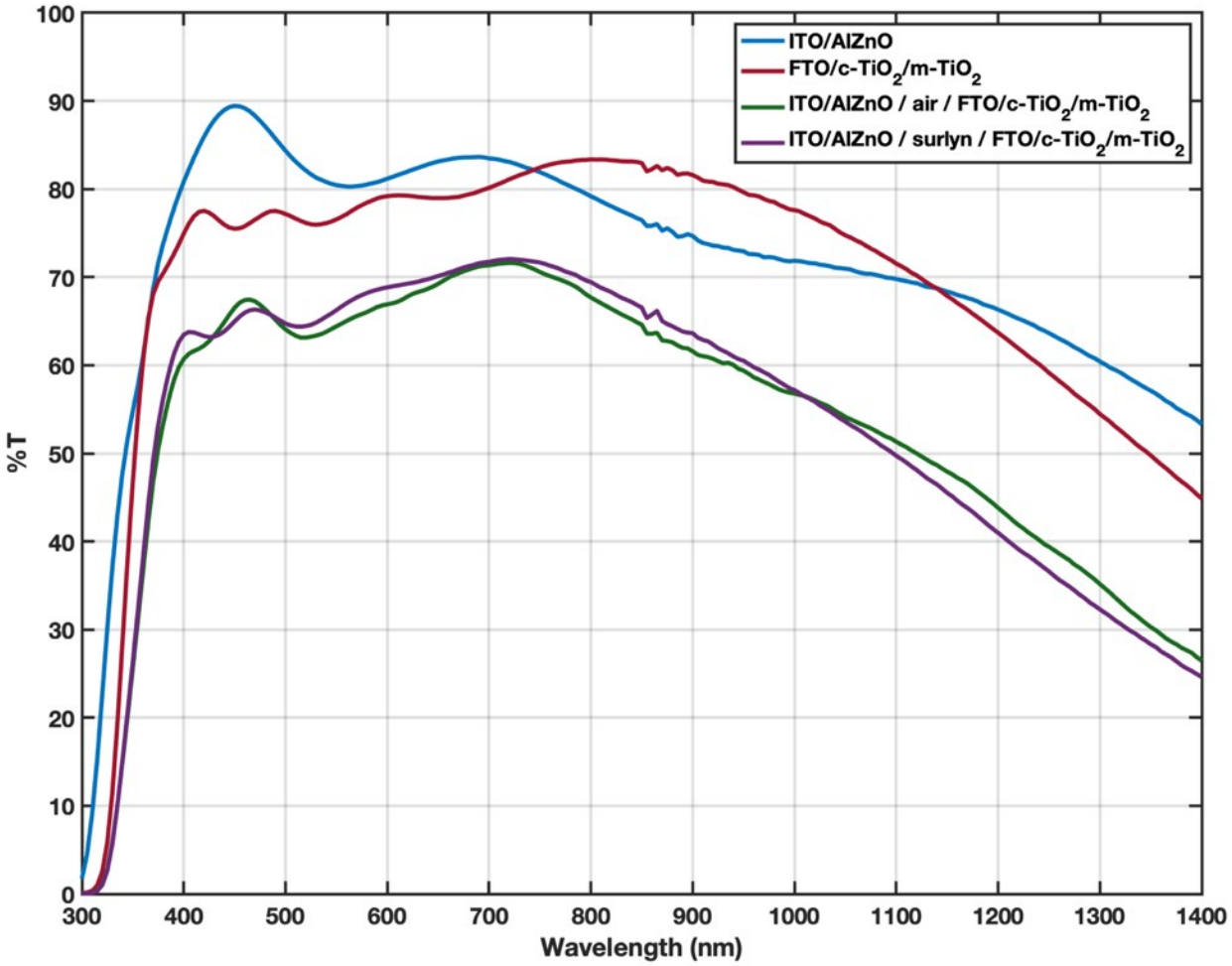


Figure S6. *Transmittance measurements of the following samples: (blue) ITO/aluminum zinc oxide (AlZnO), (red) FTO/compact TiO_2 (c-TiO_2) /mesoporous TiO_2 (m-TiO_2), (green) ITO/AlZnO/ air 'layer' /FTO/ c-TiO_2/ m-TiO_2 and (purple) ITO/AlZnO/ surlyn interlayer /FTO/ c-TiO_2/ m-TiO_2*

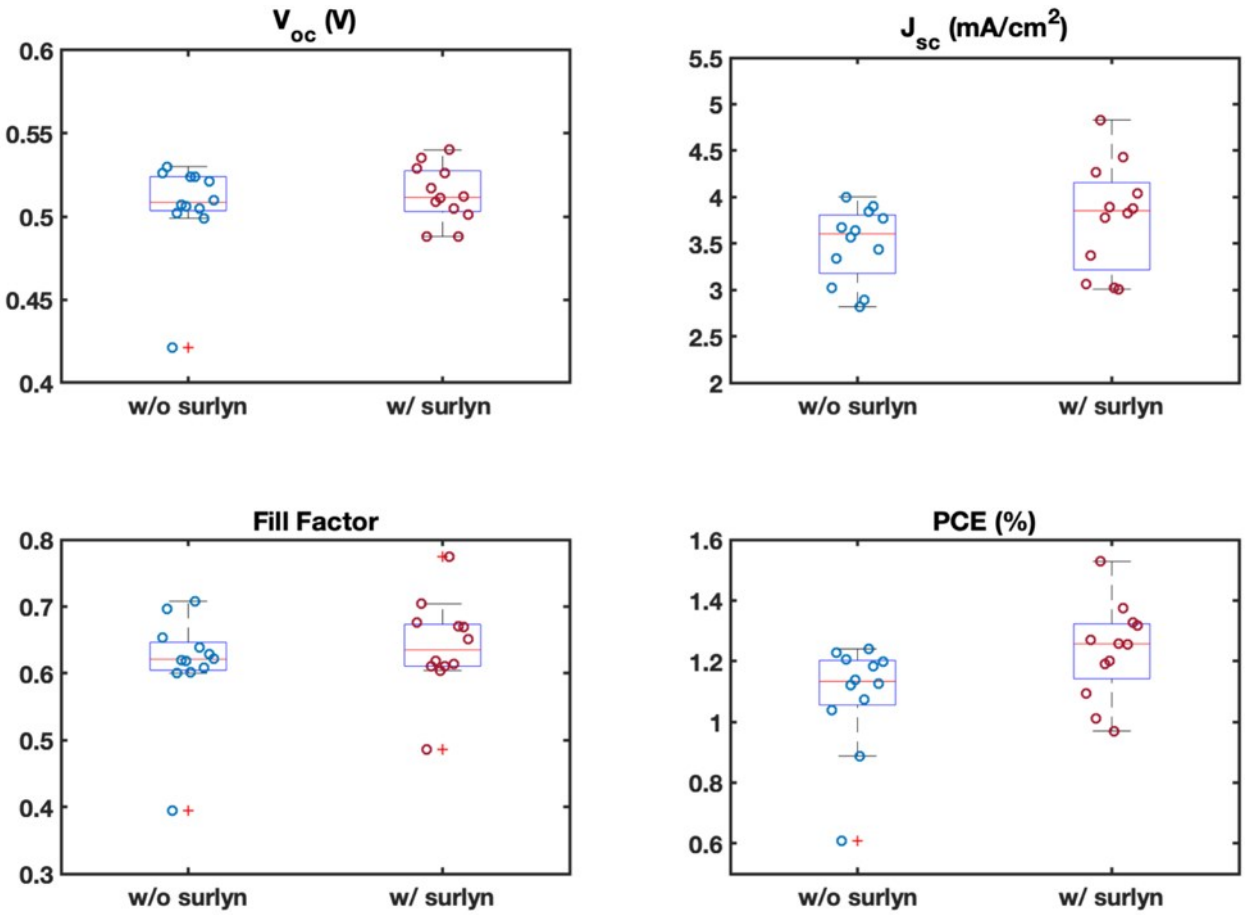
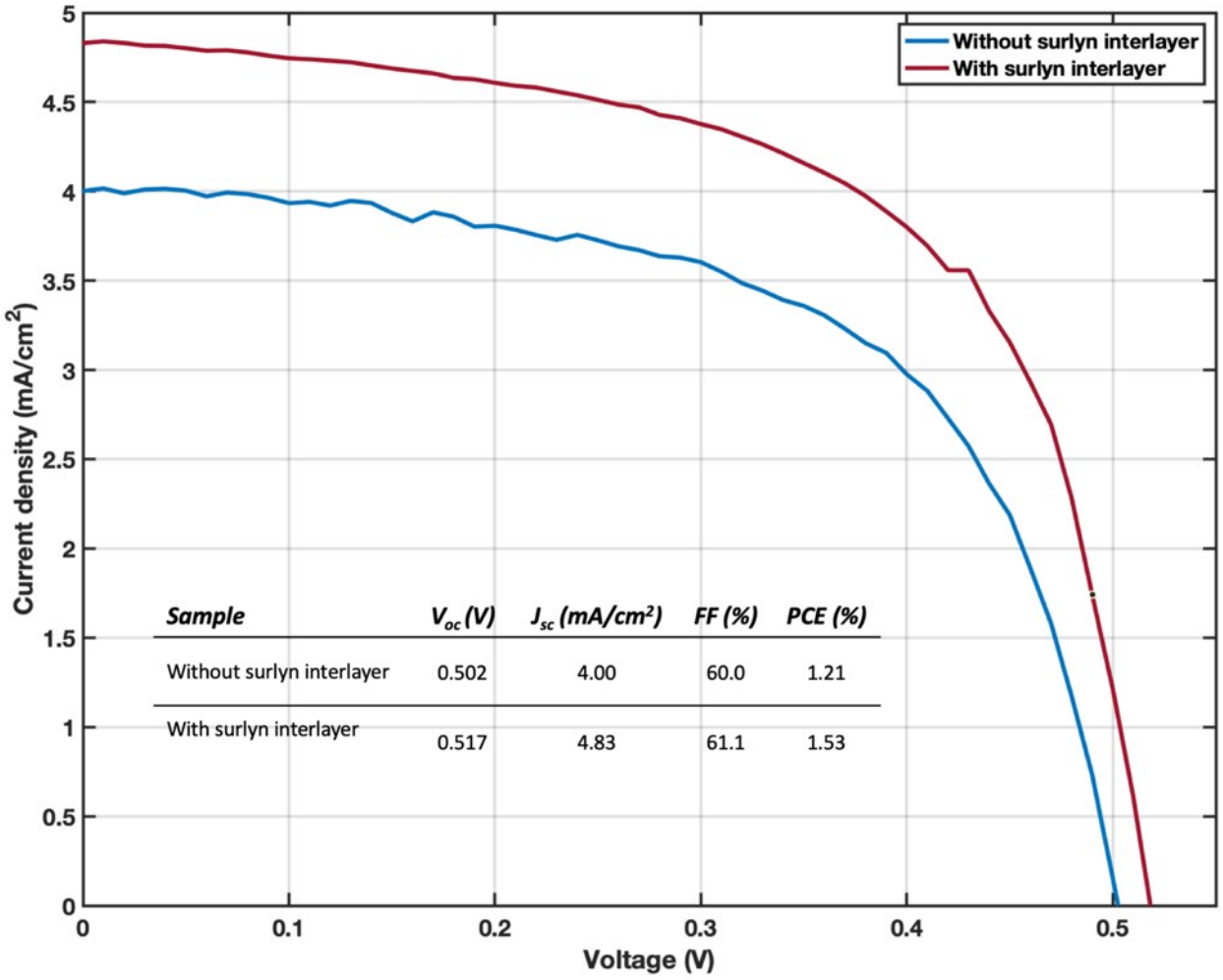
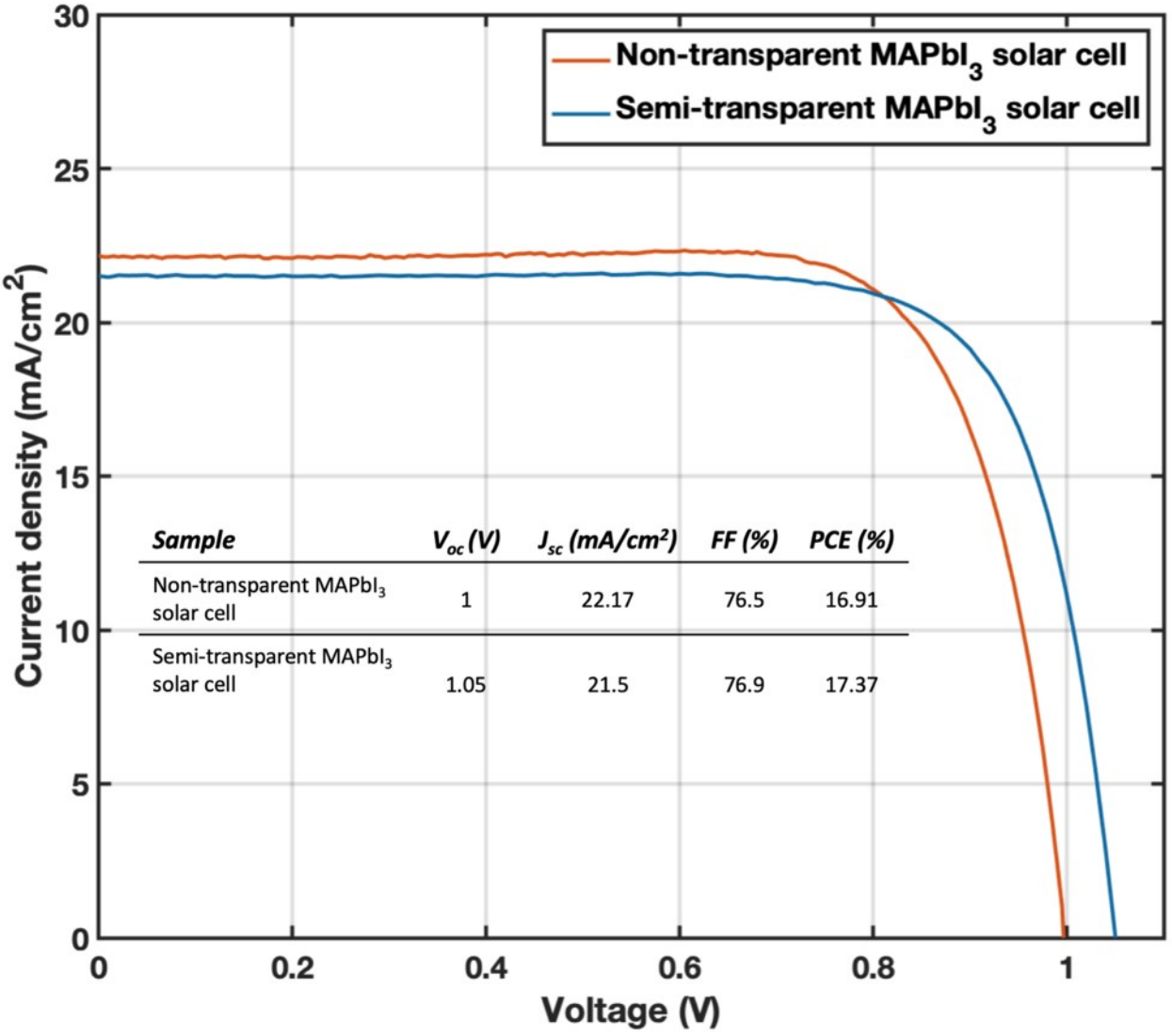


Figure S7. *Current-voltage (JV) measurements statistics for filtered PbS CQDs solar cells with surlyn interlayer (red) or without it (blue). 12 samples of PbS CQDs with both λ_{max} equal 901 and 935 nm respectively were used for these statistics measurements.*



Sample	V_{oc} *(V)*	J_{sc} *(mA/cm²)*	*FF (%)*	*PCE (%)*
Without surlyn interlayer	0.502	4.00	60.0	1.21
With surlyn interlayer	0.517	4.83	61.1	1.53

Figure S 8. *Current-voltage measurements of the champion filtered PbS CQDs solar cells with surlyn interlayer (red) or without it (blue).*



Sample	V_{oc} (V)	J_{sc} (mA/cm²)	FF (%)	PCE (%)
Non-transparent $MAPbI_3$ solar cell	1	22.17	76.5	16.91
Semi-transparent $MAPbI_3$ solar cell	1.05	21.5	76.9	17.37

Figure S9. *Current-voltage measurement of the non-transparent $MAPbI_3$ solar cell with 80 nm Au electrode (orange line) and semi-transparent $MAPbI_3$ solar cell with 10 nm Au (blue line).*