Supporting Information

Perovskite/TiO_2 Interface Passivation Using Poly(vinylcarbazole) and Fullerene for the Photovoltaic Conversion Efficiency of 21%

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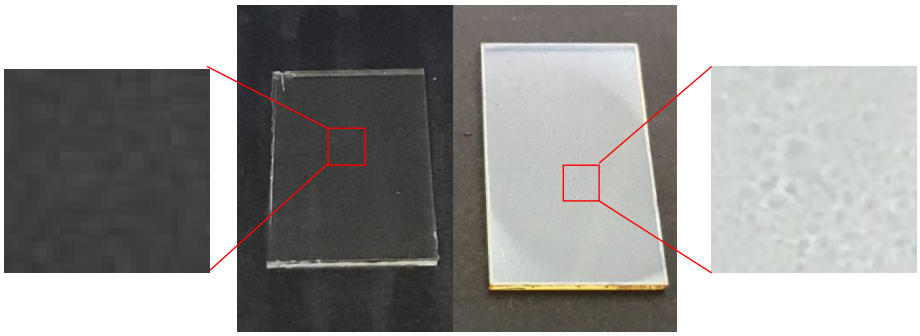


Figure S1. Photograph of the glass substrates coated with the solution of PVCz/PCBM (left) and the PCBM suspension (right).

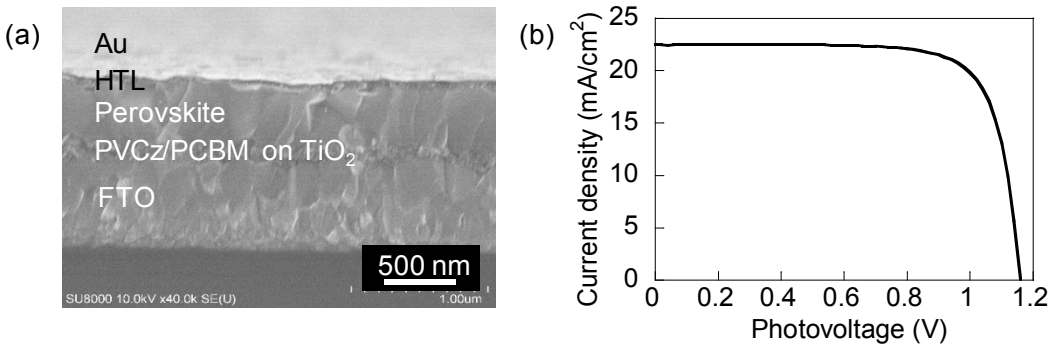


Figure S2. (a) A cross-sectional SEM image and (b) *J-V* curve of the perovskite solar cell with the PVCz/PCBM modification onto TiO_2 layer with PTAA as a HTL.

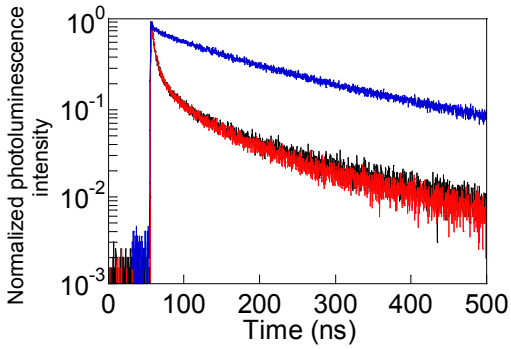
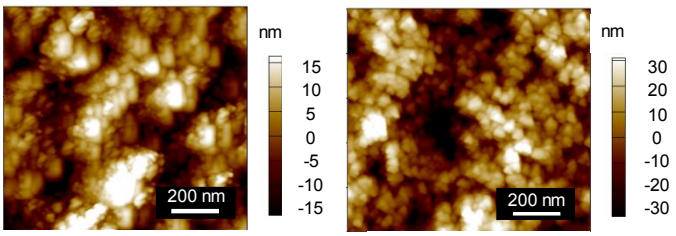


Figure S3. Photoluminescence decay kinetics of the perovskite solar cells with the PVCz/PCBM modification (red), without (black), and only perovskite (blue).



RMS = 11 nm RMS = 18 nm

Figure S4. AFM images of the TiO_2 layer with the PVCz/PCBM modification on TiO_2 layer (left) and without (right).

Table S1 Elemental content on the points

	wt %		
	1 (perovskite)	2 (interface)	3 (TiO_2)
C	48.5	53.6	55.0
Pb	23.5	22.0	15.9
I	21.9	18.5	15.1
Br	5.1	4.5	5.3
N	1.0	4.5	8.7

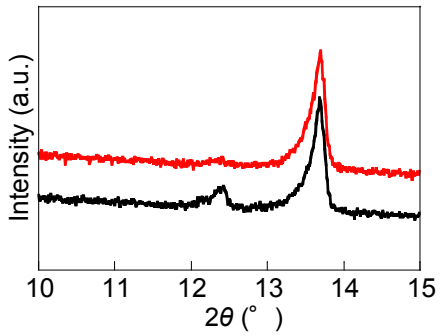


Figure S5. XRD Patterns of the perovskite in the solar cells with PVCz/PCBM modification on TiO_2 layer (red) and without (black).

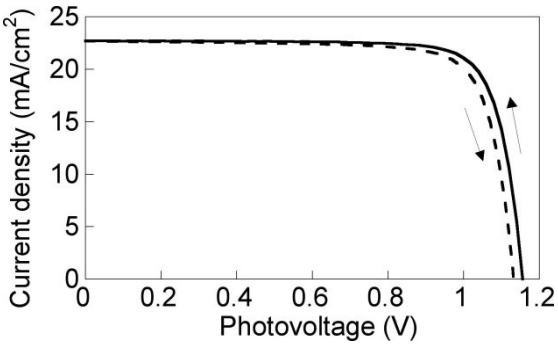


Figure S6. *J-V* curves under reverse and forward scans for the device corresponding to Figure 2.

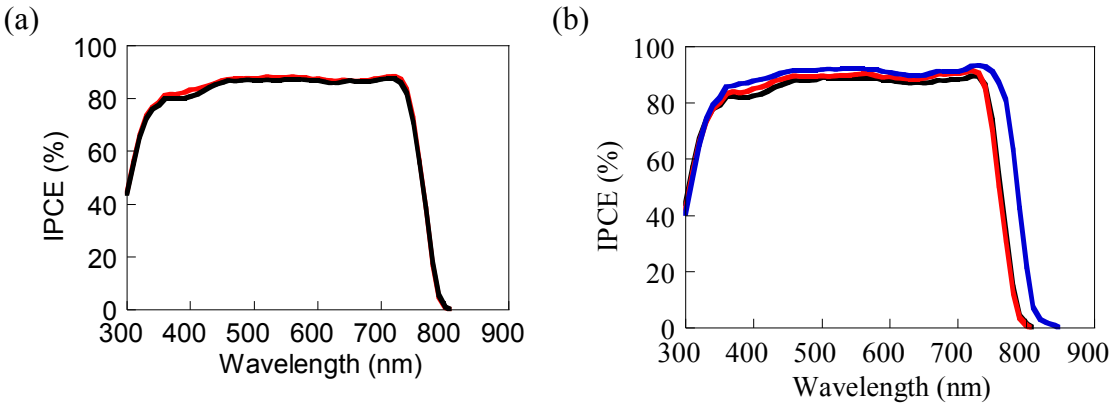


Figure S7. EQE spectra of the device (a) with PVCz/PCBM treatment on TiO2 layer (b) composed of various perovskite layers; black: anti-solvent method; red: anti-solvent method + FABr; blue: 2 step method.