

Supporting information

Carbon electrode engineering for high efficiency all inorganic perovskite solar cells

Longfei Mi^{*ab}, Yan Zhang^b, Taotao Chen^b, Enze Xu^b and Yang Jiang^{b*}

^aDepartment of Materials Science and Engineering, School of Civil Engineering, Qingdao University of Technology, Qingdao, Shandong, 266000, P. R. China.

^bSchool of Materials Science and Engineering, Hefei University of Technology, Hefei, Anhui, 230009, P. R. China.

Table S1 Comparison of CsPbBr₃ PSCs with carbon electrode.

Device	V _{oc} (V)	J _{sc} (mA cm ⁻²)	FF (%)	PCE (%)	Ref.
FTO/TiO₂/CsPbBr₃/Mixed carbon	1.357	7.16	72.97	7.09	<i>This work</i>
FTO/CsPbBr ₃ /carbon	1.05	4.64	48.2	2.35	<i>Small</i> 2018, 14, 1704443
FTO/TiO ₂ /CsPbBr ₃ /Carbon	1.29	5.7	68	5.6	<i>ACS Appl. Mater. Interfaces.</i> 2016, 8, 33649-33655.
FTO/TiO ₂ /CsPbBr ₃ /Carbon	1.24	7.4	73	6.7	<i>J. Am. Chem. Soc.</i> 2016, 138, 15829-15832.
FTO/TiO ₂ /CsPbBr ₃ /Carbon	1.522	7.24	80.4	8.86	<i>Mater. Sci. Semicond. Process.</i> 2019, 98, 39
FTO/TiO ₂ /CsPbBr ₃ /CuPc/ Carbon	1.26	6.62	74.4	6.21	<i>Nano-Micro Lett.</i> 2018, 10, 34.
FTO/TiO ₂ /CsPbBr ₃ /Carbon: PtNiNW	1.432	6.78	81.0	7.86	<i>ChemSusChem</i> 2018, 11, 1432
FTO/TiO ₂ /CsPbBr ₃ /MXene/ Carbon	1.444	8.54	73.08	9.01	<i>J. Mater. Chem. A</i> 2019, 7, 20597
FTO/TiO ₂ /CsPbBr ₃ /MnS/ Carbon	1.52	8.28	83	10.45	<i>ACS Appl. Mater. Interfaces</i> 2019, 11, 29746.
FTO/TiO ₂ /CsPbBr ₃ /Cu(Cr, M)O ₂ /Carbon	1.165	7.81	85.5	10.79	<i>Angew. Chem. Int. Ed.</i> 2019, 58, 1-6.

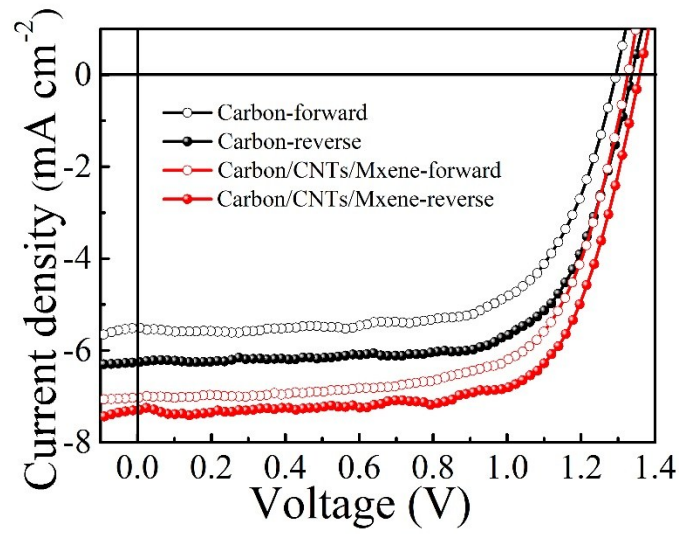


Fig. S1 J-V curves of the devices under forward and reverse scan.

Table S2 Parameters of CsPbBr₃ PSCs under forward and reverse scan.

Device	V _{oc} (V)	J _{sc} (mA cm ⁻²)	FF (%)	PCE (%)
Carbon-forward	1.293	5.54	69.38	4.97
Carbon-reverse	1.336	6.15	71.44	5.87
Carbon/CNTs/MXene -forward	1.327	6.98	68.46	6.34
Carbon/CNTs/MXene -reverse	1.357	7.16	72.97	7.09