



Supplementary Materials

A Brief Review of the Role of 2D Mxene Nanosheets toward Solar Cells Efficiency Improvement

Table S1. Summary of the key parameters for the solar cells employing MXenes as hole/electron transport layers Device.

Device architecture	J_{sc} (mA·cm ⁻²)	Voc (V)	FF (%)	PCE (%)	Year	Reference
ITO/U-Ti ₃ C ₂ T _x /PBDB-T:ITIC/Ca/Al (HTL)	15.98	0.89	64	9.02	2019	[1]
ITO/ETL/CH ₃ NH ₃ PbI ₃ /spiro-OMeTAD/Ag	23.11	1.07	74	18.29	2021	[2]
ITO/NiO/MAPbI ₃ /PCBM/BCP/Ag	22.88	1.09	77	19	2021	[3]
ITO/SnO ₂ /perovskite/spiro-MeOTAD/MoO ₃ /Au	24.96	1.14	0.798	23.3	2021	[4]
FTO/Ti ₃ C ₂ T _x @TiO ₂ /Cs ₂ AgBiBr ₆ /Spiro-OMeTAD/MoO ₃ /Ag	4.14	0.96	70	2.81	2021	[5]
MXene/m-SWCNTs (2:1)	25.09	1.073	80	21.42	2021	[6]
ITO/UH-Ti ₃ C ₂ T _x /PBDB-T:ITIC/MoO ₃ /Al (ETL)	17.36	0.87	60	9.06	2019	[1]

Table S2. Summary of the key parameters for the solar cells employing MXenes as electrodes.

Device architecture	J_{sc} (mA·cm ⁻²)	Voc (V)	FF (%)	PCE (%)	Year	Reference
FTO/TiO ₂ /MAPbI ₃ /Ti ₃ C ₂ T _x	22.96	0.95	63	13.83	2019	[7]
(Ti ₃ C ₂)/(V ₂ C)	12.8	0.724	45	7.2	2021	[8]
(ITO/treated Nb ₂ CT _x /MAPbI ₃)	23.06	1.128	79.75	20.74	2021	[9]
FTO/c-TiO ₂ /CsPbBr ₃ /Carbon: CNT:Ti ₃ C ₂ T _x	7.16	1.357	72.97	7.09	2019	[10]
MXene/CoS composite CE	21.29	0.671	56.6	8.09	2021	[11]
Ti ₃ C ₂ CE-based DSSCs	17.1	0.758	73	8.68	2021	[12]
Ti ₃ C ₂ T _x /n-Si/n-Si/p-Si/Al ₂ O ₃ /SiNx/Ag/Al	36.7	0.54	57.99	11.47	2019	[13]

Table S3. Summary of the key parameters for the solar cells employing MXenes as an additive Device.

Device architecture	J_{sc} (mA·cm ⁻²)	Voc (V)	FF (%)	PCE (%)	Year	Reference
FTO/c-TiO ₂ :Ti ₃ C ₂ T _x /m-TiO ₂ :Ti ₃ C ₂ T _x /Ti ₃ C ₂ T _x /MAPbI ₃ :Ti ₃ C ₂ T _x /Spiro-OMeTAD/Au	23.82	1.09	77.6	20.14	2019	[14]
FTO/SnO ₂ /CH ₃ NH ₃ PbI ₃ /spiro-OMeTAD/Au	23.48	1.12	73.66	19.27	2021	[15]
FTO/SnO ₂ -TiO _x Cl _{4-2x} /CsPbBr ₃ :Ti ₃ C ₂ Cl _x /Ti ₃ C ₂ Cl _x /carbon	7.87	1.702	82.7	11.08	2021	[16]
Glass/ITO/SnO ₂ /2D perovskite/Spiro-OMeTAD/Ag	20.87	1.11	67.84	15.71	2021	[17]
ITO/SnO ₂ /MAPbI ₃ :Ti ₃ C ₂ T _x /Spiro-OMeTAD/Au	22.26	1.03	76	17.41	2018	[18]
ITO/SnO ₂ -Ti ₃ C ₂ /MAPbI ₃ /Spiro-OMeTAD/Ag	23.14	1.06	75	18.34	2019	[19]
ITO/ZnO:Ti ₃ C ₂ T _x /PBDB-T:ITIC/MoO ₃ /Ag	18.63	0.93	70.39	12.2	2020	[20]
ITO/ZnO:Ti ₃ C ₂ T _x /PM ₆ :Y ₆ /MoO ₃ /Ag	26.38	0.83	75.4	16.51	2020	[20]
ITO/ZnO:Ti ₃ C ₂ T _x /PTB7:PC ₇₁ BM/MoO ₃ /Ag	17.53	0.77	69.33	9.36	2020	[20]

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