Supporting Information

Passivation of defects by tetrafluoroterephthalonitrile introduced to $MAPbI_3$ for high-performance perovskite photodetectors

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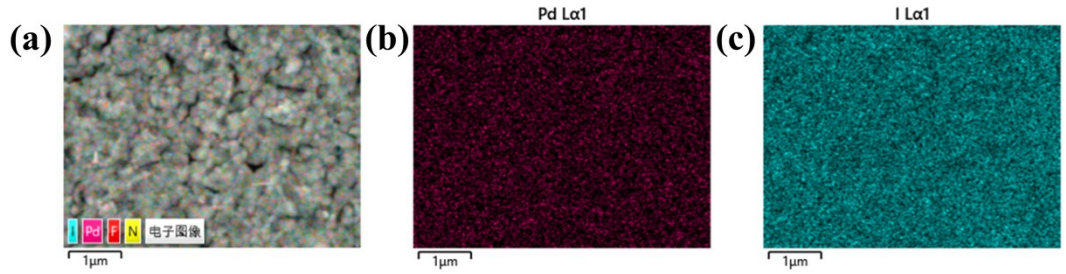

Fig. S1 (a). EDS image of perovskite film with TFTPN. (b). EDS image of Pb. (c). EDS image of I.

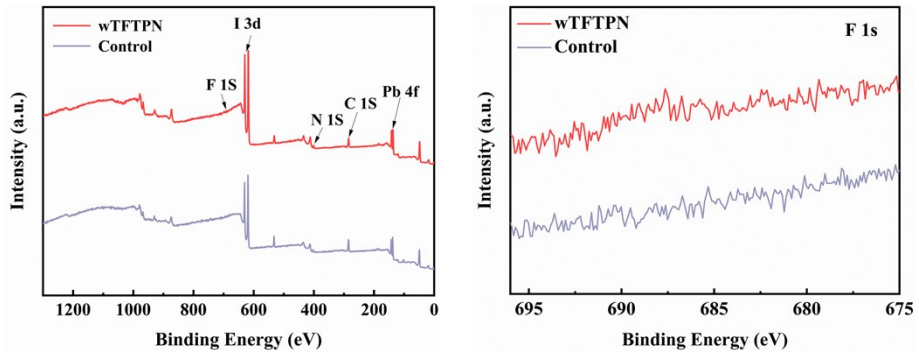

Fig. S2 (a). Full XPS spectrum of perovskite film. (b).F 1s orbital XPS spectra.

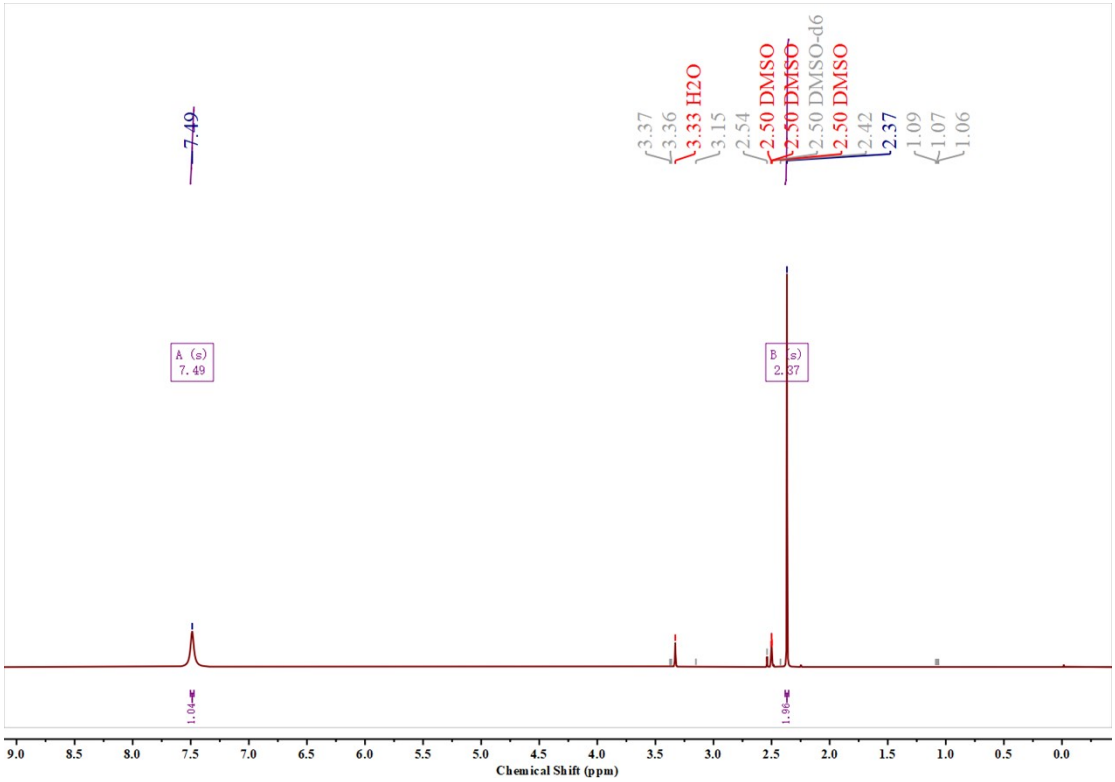

Fig. S3 ^{1}H NMR spectra of MAI in d-DMSO.

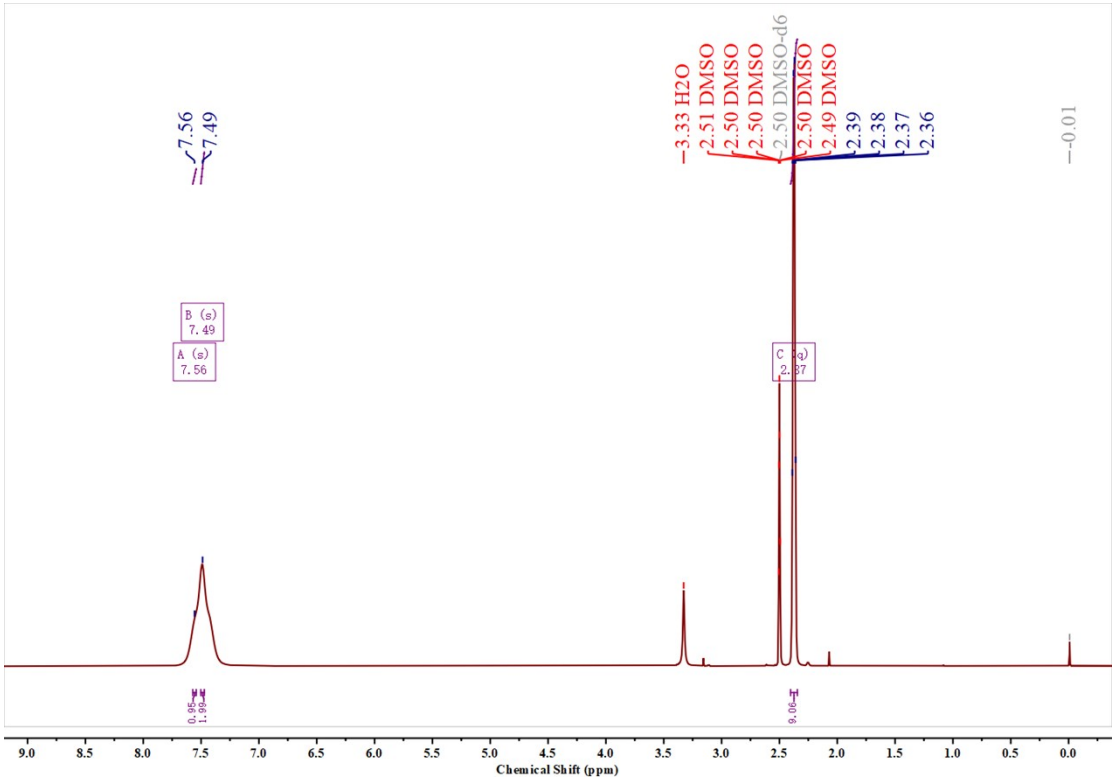

Fig. S4 ^{1}H NMR spectra of TFTPN/MAI in d-DMSO.

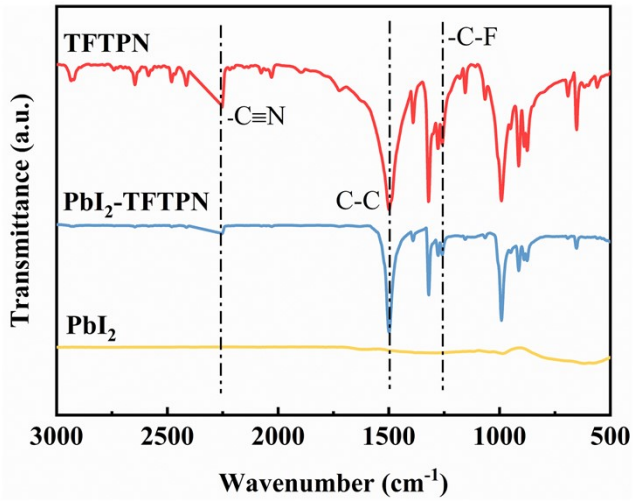

Fig. S5 FTIR spectra of PbI_2 power, TFTPN power, and mixed power of PbI_2 and TFTPN.

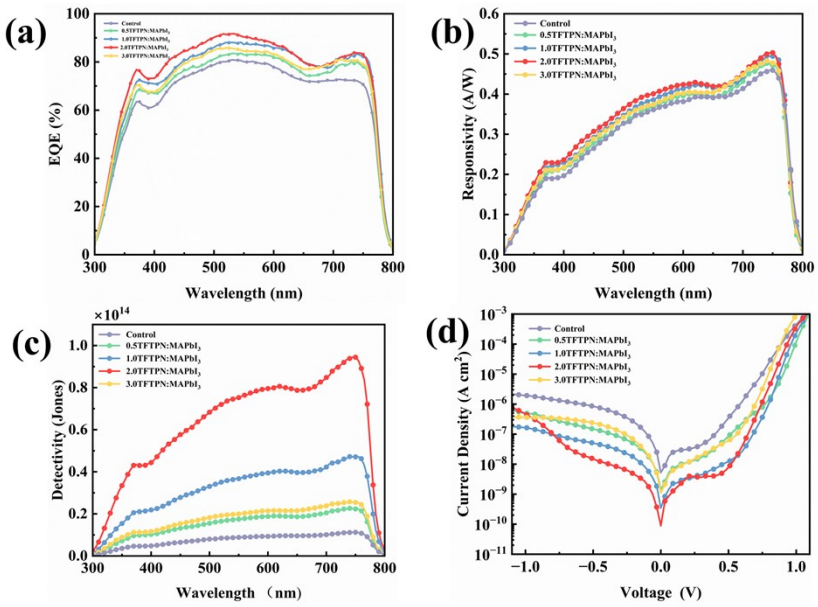

Fig. S6 (a) EQE response curves for PDs doped with or without TFTPN. (b) Responsiveness curves for PDs doped with or without TFTPN. (c) Detection rate curves for PDs doped with or without TFTPN. (d) Dark current density profile of PDs doped with or without TFTPN.

Table. S1 Comparison of parameters with previously reported photodetector.

Device structure	R (A/W)	D* (Jones)	Bias(V)	Detection wavelength (nm)	Refs
ITO/PEDOT: PSS/$MAPbI_3$ (with ODT)/$PC_{70}BM$/Al	0.366	1.45×10^{12}	-0.1	350-850	[1]
ITO/NiO_x/$MAPbI_3$ (with PBFDO)/PCBM/BCP/Ag	0.49	8.1×10^{12}	0	300-800	[2]
ITO/NiO_x/$MAPbI_3$(with urea)/PCBM/BCP/Ag	1.06	7.28×10^{12}	-0.1	400-700	[3]
ITO/PEDOT:PSS/$MAPbI_3$/QD@APDEMS/$PC_{70}BM$/Ag	0.469	1.77×10^{12}	-0.1	400-800	[4]
ITO/NiOx/PMMA/ MAPbI3/PMMA/PCBM/ZnO/BCP/Al	0.415	1.30×10^{12}	0	300-800	[5]
ITO/PEDOT:PSS/$(BA)_2MA_3Pb_4I_{13}$/PCBM/BCP/Ag	0.33	1.22×10^{14}	-	455-770	[6]
ITO/NiO_X/$MAPbI_3$(TFTPN)/C60/BCP/Cu	0.503	9.44×10^{13}	0	300-800	This work

Table.S2 Performance parameters of PDs doped with different concentrations of TFTPN.

Concentration (mg mL^{-1})	EQE_{max} (%)	R_{max} (A/W)	D^*_{max} (Jones)	Jσ (A cm^{-2})
0	82.68	0.460	1.12×10^{13}	5.24×10^{-9}
0.5	83.53	0.477	2.25×10^{13}	1.40×10^{-9}
1.0	88.10	0.495	4.71×10^{13}	3.45×10^{-10}
2.0	91.73	0.503	9.44×10^{13}	8.86×10^{-11}
3.0	85.66	0.483	2.55×10^{13}	1.11×10^{-9}

References

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