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Supporting Information

Passivated perovskite crystallization and stability in organic-inorganic halide solar cells by doping a donor polymer

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Keywords: perovskite solar cells; P-type materials; passivation; crystallization; stability;

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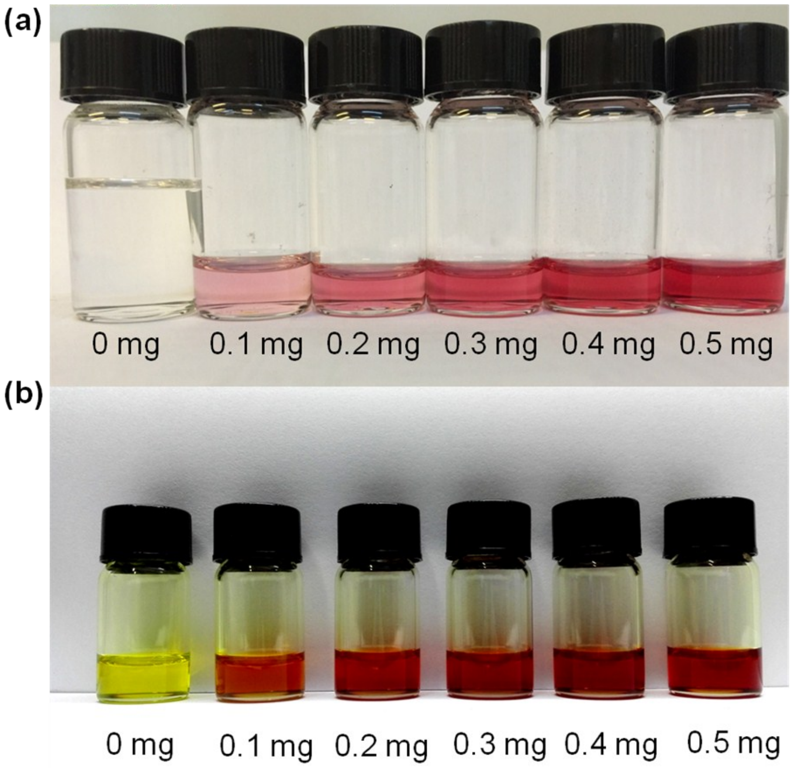

Figure S1. Different concentrations of PCDTBT dissolved in 1mL (a) DMF, and (b) perovskite precursor solution.

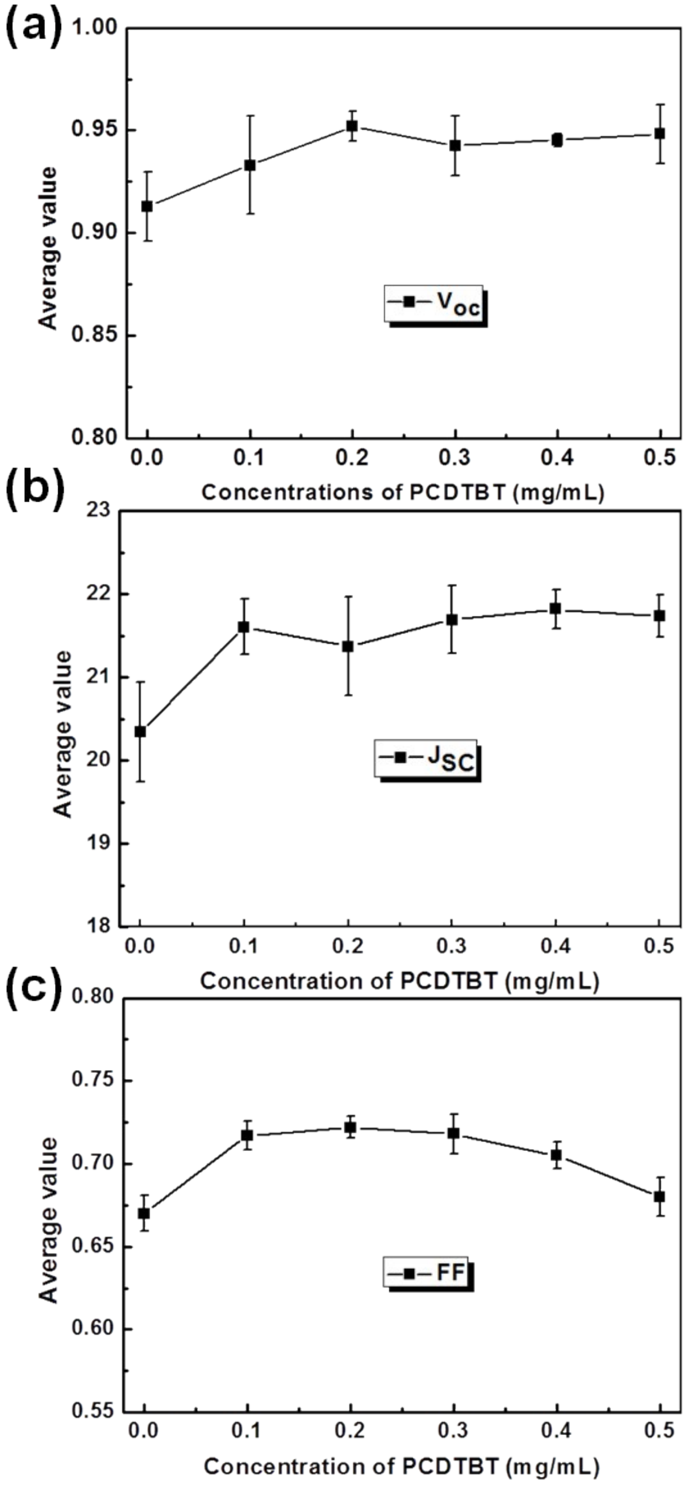

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Table S1. EIS parameters of pero-HSCs based on $CH_3NH_3PbI_xCl_{3-x}$:PCDTBT and $CH_3NH_3PbI_xCl_{3-x}$

	$CH_3NH_3PbI_xCl_{3-x}$:PCDTBT（0.3 mg/mL）	**$CH_3NH_3PbI_xCl_{3-x}$**
R_{SH} ($\Omega\cdot cm^2$)	7.25	12.23
R_{CT} ($\Omega\cdot cm^2$)	447.23	953.25
C (F)	8.85×10^{-6}	4.2×10^{-6}

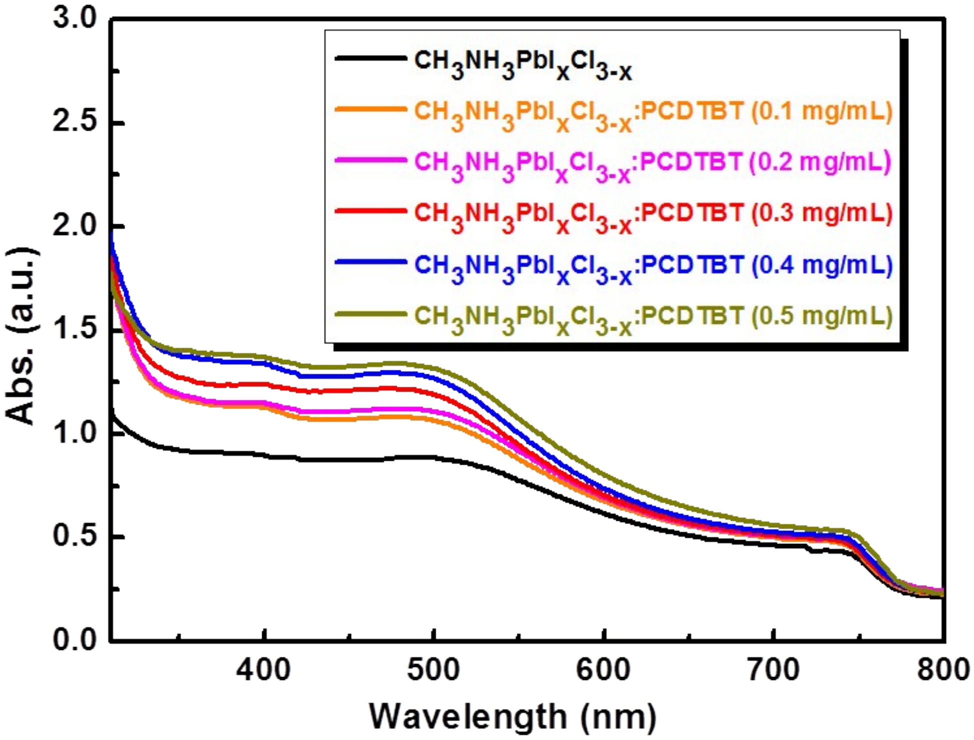
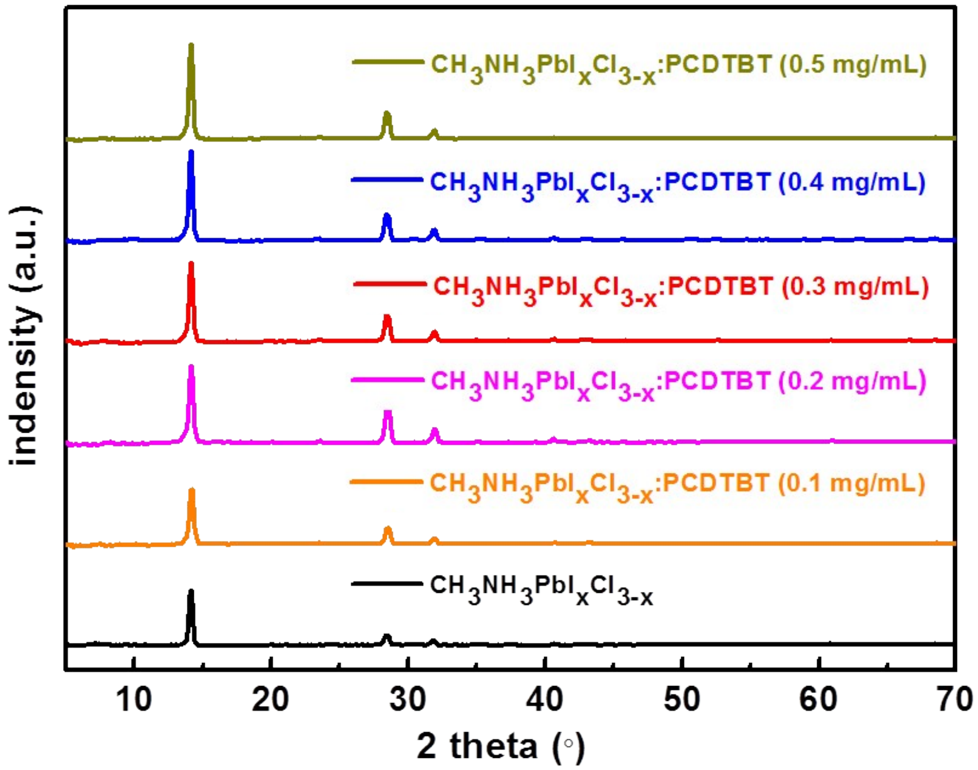


Figure S3. UV-Vis absorption spectra of films with $CH_3NH_3PbI_xCl_{3-x}$ and $CH_3NH_3PbI_xCl_{3-x}$:PCDTBT (0.1-0.5 mg/mL).



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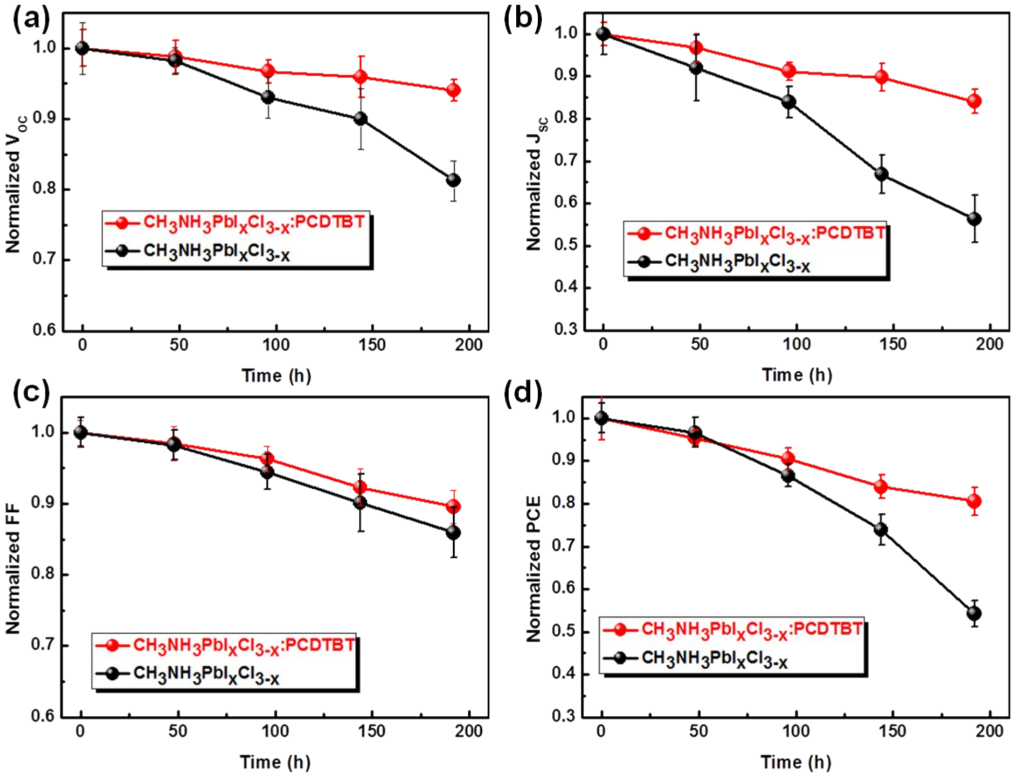

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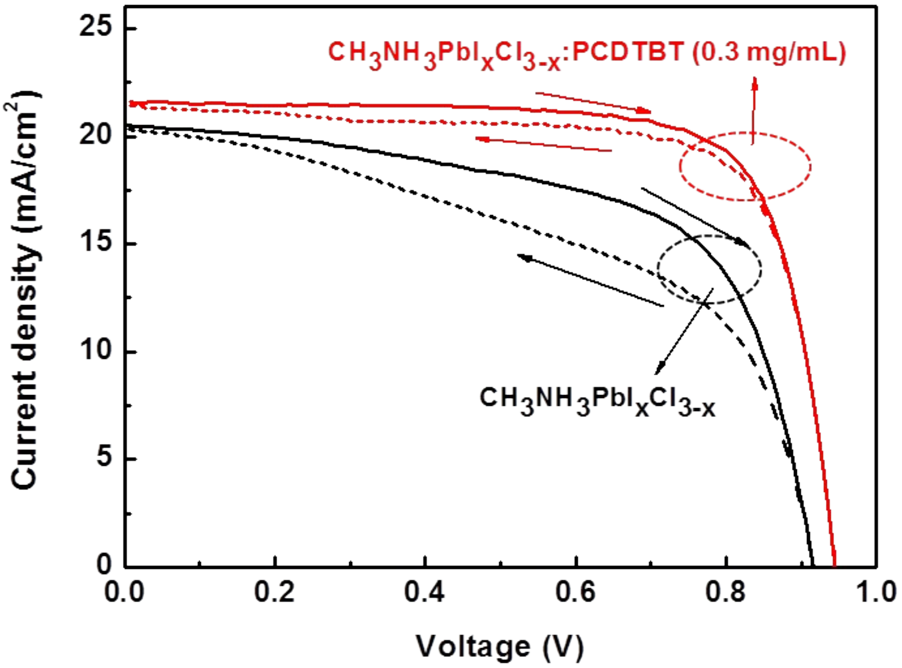

Figure S6. *J-V* curves of different pero-HSCs measured in forward scan(solid lines) and reverse scan (dotted lines).

Table SII. the parameters of *J-V* hysteresis effect on different pero-HSCs.

Device	**Scan direction**	**V_{OC}(V)**	**J_{SC}(mA/cm^2)**	**FF**	**PCE(%)**
$CH_3NH_3PbI_xCl_{3-x}$	Forward	0.91	20.50	0.61	11.85
	Reverse	0.91	20.32	0.50	9.75
	Average	0.91	20.41	0.55	10.80
$CH_3NH_3PbI_xCl_{3-x}$:PCDTBT(0.3mg/mL)	Forward	0.95	21.58	0.75	15.38
	Reverse	0.95	21.27	0.75	15.00
	Average	0.95	21.43	0.75	15.19