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Supporting Information

Effect of the incorporation of poly(ethylene oxide) copolymer on the stability of perovskite solar cells

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Table S1. Volumes used in the preparation of perovskite dispersions with P(EO/EP).

P(EO/EP) concentration (mg mL^{-1})	Volume of $MAPbI_3$ stock solution (µL)	Volume of P(EO/EP) stock solution (µL)	Volume of DMF:DMSO (4:1) (µL)
Standard	130	0	20
0.5	130	4	16
1.0	130	8	12
1.5	130	12	8
2.0	130	16	4
2.5	130	20	0

Table S2. Summary of the photovoltaic parameters of the PSCs measured under simulated AM 1.5G solar illumination (intensity = 100 mW cm^{-2}) using forward scan (F) and reverse scan (R) .The values in parenthesis are for the best-performing devices.

P(EO/EP) concetration	Scan	V_{oc} (V)	J_{sc} (mA/cm^2)	FF (%)	PCE (%)	hysteresis index (%)
Standard	F	1.05±0.01 (1.05)	21.48±0.24 (21.83)	64.01±2.48 (59.21)	14.43±0.61 (13.57)	12.39±4.27
	R	1.07±0.01 (1.08)	21.28±0.33 (21.51)	72.12±1.08 (73.36)	16.42±0.46 (17.04)	
0.5 mg mL^{-1}	F	1.04±0.01 (1.04)	20.16±1.24 (20.60)	59.56±2.20 (56.09)	12.48±0.83 (12.01)	12.87±6.62
	R	1.05±0.01 (1.07)	19.80±1.02 (20.27)	68.99±3.37 (73.93)	14.34±1.32 (16.03)	
1.0 mg mL^{-1}	F	1.06±0.01 (1.04)	19.55±0.28 (20.38)	60.35±2.12 (60.57)	12.50±0.54 (12.20)	10.59±4.89
	R	1.07±0.01 (1.06)	19.32±0.37 (20.16)	67.91±2.16 (69.64)	14.03±0.31 (14.14)	
1.5 mg mL^{-1}	F	1.05±0.01 (1.04)	20.18±0.45 (19.73)	62.12±2.65 (60.74)	13.16±0.50 (12.46)	7.27±5.03
	R	1.06±0.01 (1.07)	20.11±0.40 (19.63)	65.98±3.20 (70.00)	14.06±0.82 (14.70)	
2.0 mg mL^{-1}	F	1.03±0.01 (1.04)	19.52±0.84 (20.08)	58.66±5.46 (63.66)	11.79±1.73 (13.29)	7.49±7.54
	R	1.04±0.01 (1.04)	19.03±1.18 (19.97)	64.03±3.50 (64.12)	12.68±1.14 (13.31)	

*Average and standard deviation values were obtained based on 12 devices.

Figure S1: Photographs of the setup at XRD2/LNLS beamline for in situ GIWAXS measurements.

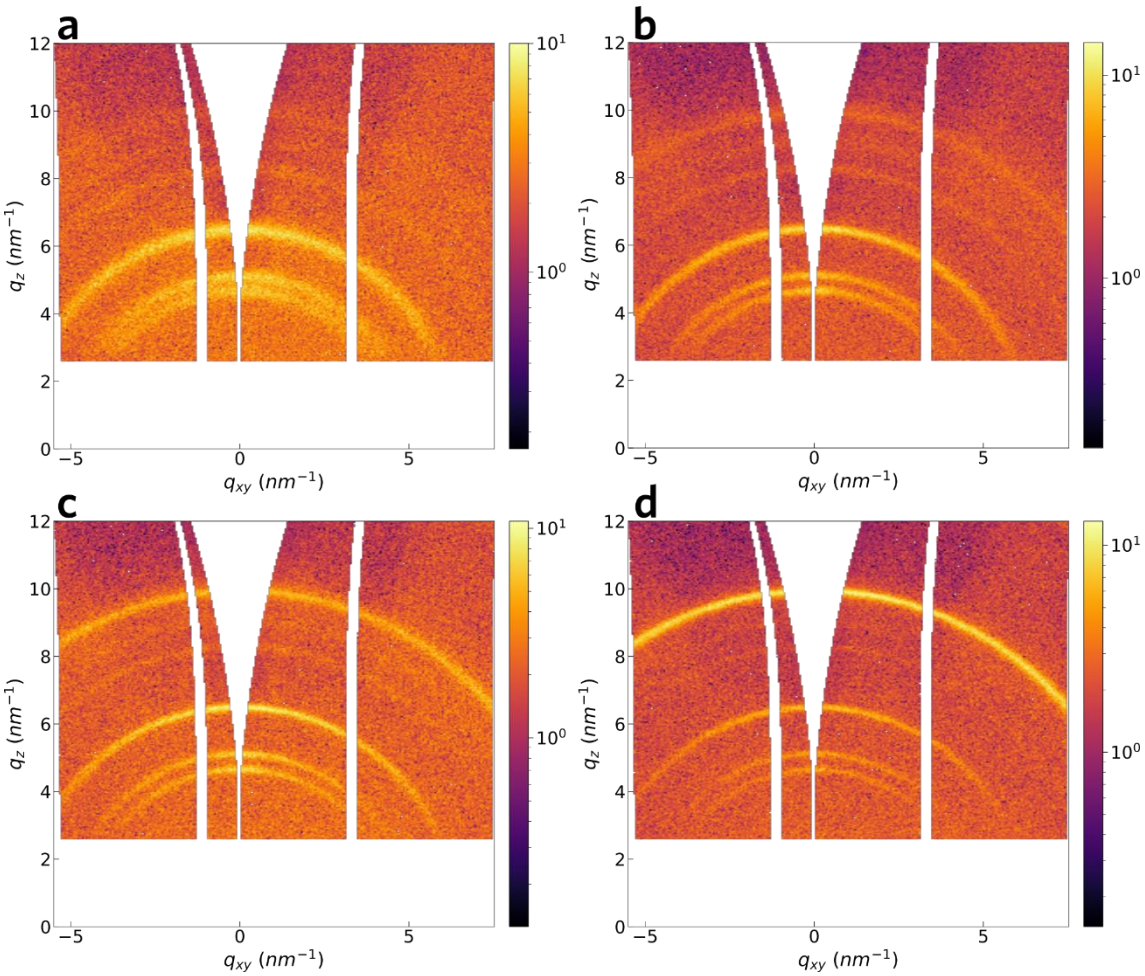

Figure S2: GIWAXS reciprocal lattice maps for standard perovskite sample. (a) The moment at anti-solvent is dripped onto the film, (b) after 200 s, (c) after 400 s and (d) after 600 s.

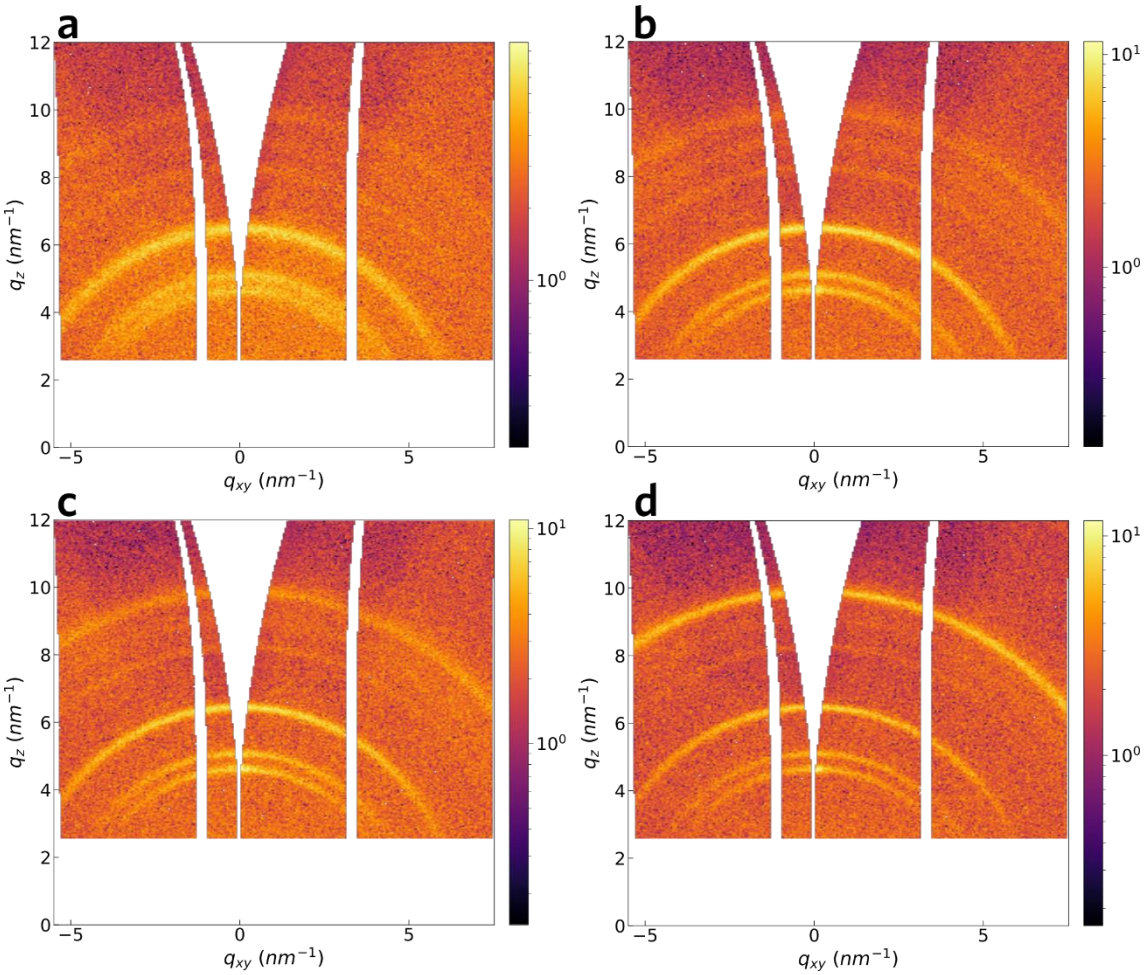

Figure S3: GIWAXS reciprocal lattice maps for film containing 0.5 mg mL^{-1} of P(EO/EP) copolymer. (a) the moment at anti-solvent is dripped onto the film, (b) after 200 s, (c) after 400 s and (d) after 600 s.

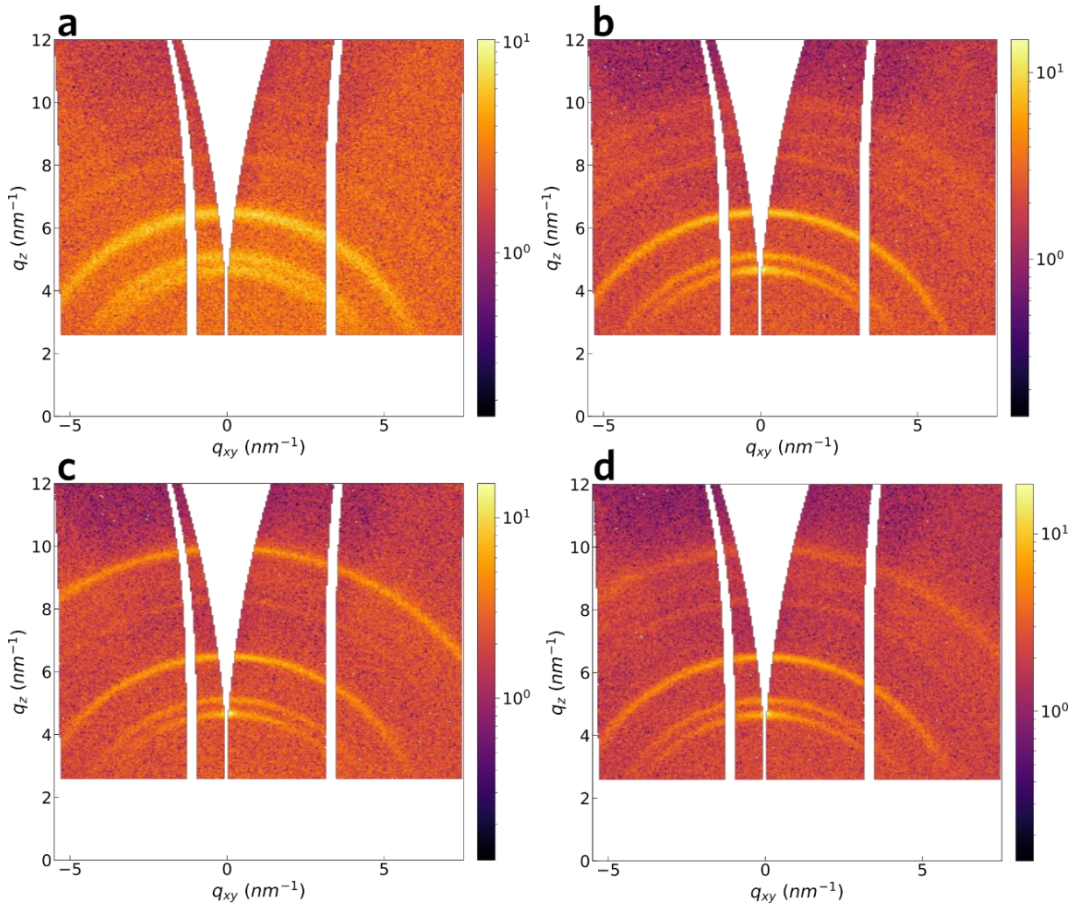

Figure S4: GIWAXS reciprocal lattice maps for film containing 1.0 mg mL^{-1} of P(EO/EP) copolymer. (a) the moment at anti-solvent is dripped onto the film, (b) after 200 s, (c) after 400 s and (d) after 600 s.

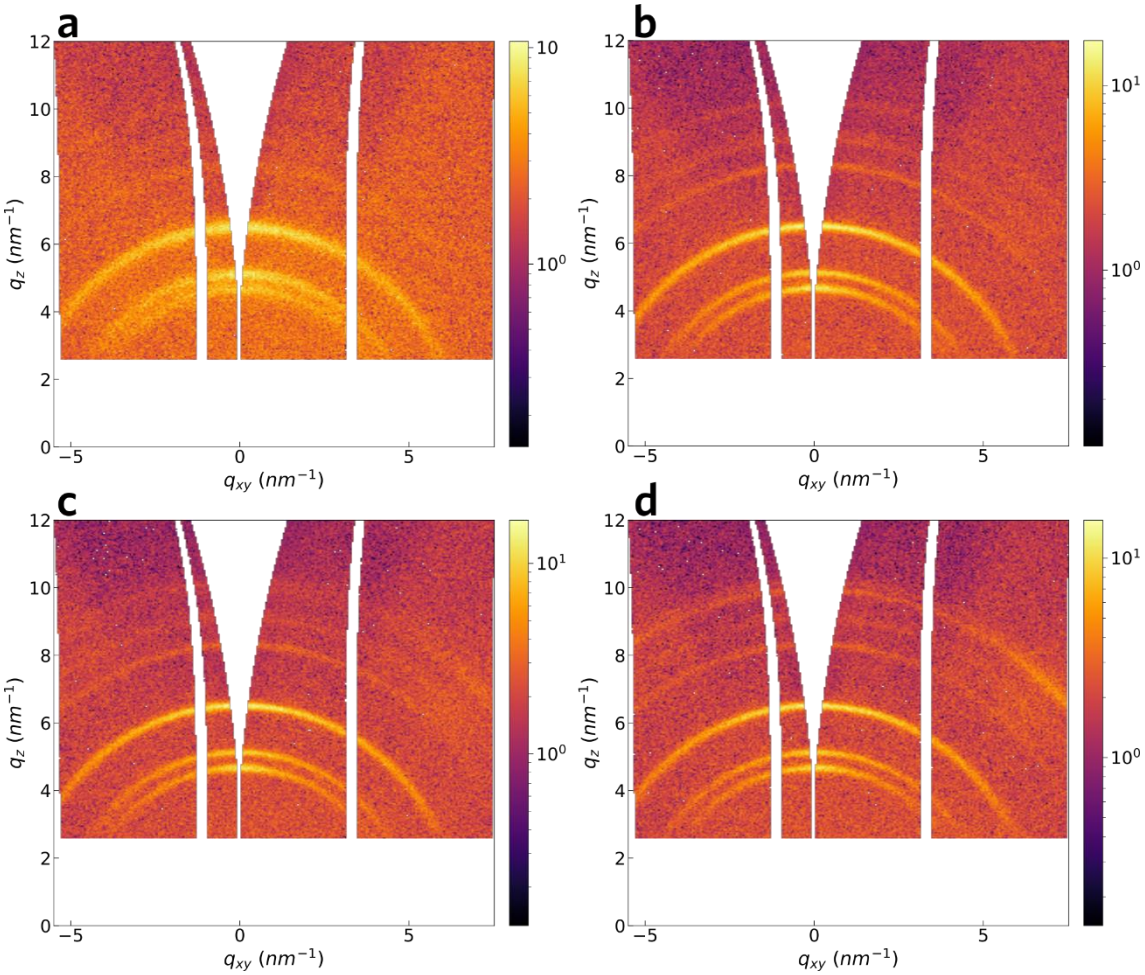

Figure S5: GIWAXS reciprocal lattice maps for film containing 1.5 mg mL^{-1} of P(EO/EP) copolymer. (a) the moment at anti-solvent is dripped onto the film, (b) after 200 s, (c) after 400 s and (d) after 600 s.

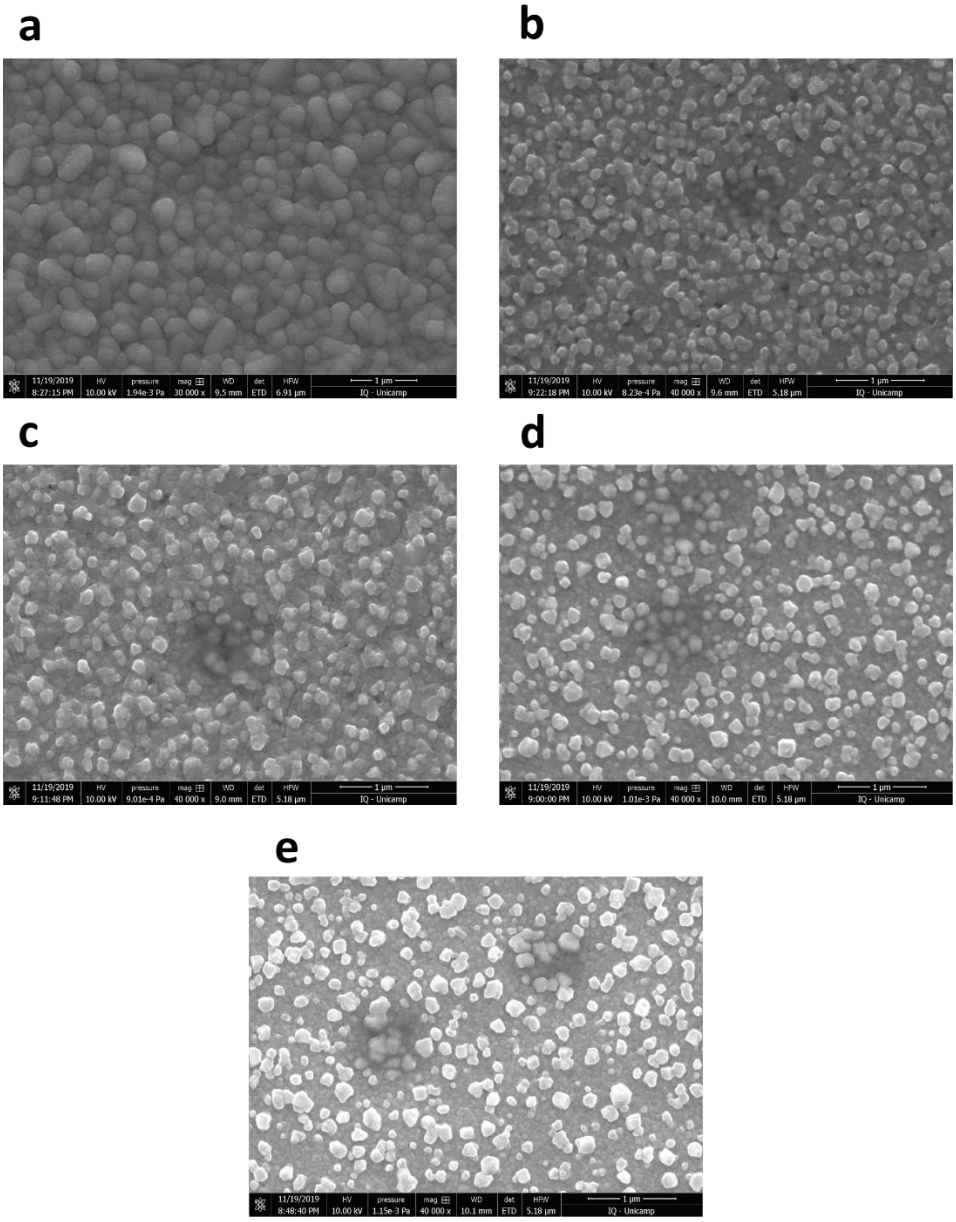

Figure S6: SEM images of perovskite films: a) without the addition of P(EO/EP) or with b) 0.5 mg mL^{-1} of P(EO/EP) , c) 1.0 mg mL^{-1} of P(EO/EP), d) 1.5 mg mL^{-1} of P(EO/EP) and e) 2.0 mg mL^{-1} deposited on FTO/c-TiO_2/meso-TiO_2 layers.

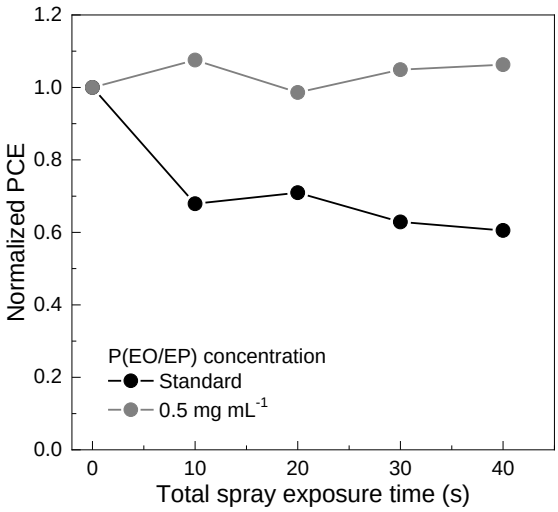

Figure S7: Normalized PCE evolution as a function of spray time for PSCs without (standard) and with 0.5 mg mL^{-1} of P(EO/EP). After each interval of exposure of the PSC to the spray, we performed JV measurements under illumination (100 mW cm^{-2}). 1st JV measure (before spray exposure); 2nd J-V measure (10 s of spray exposure); 3rd J-V measure (20 s of spray exposure); 4th J-V measure (30 s of spray exposure) and 5th J-V measure (40 s of spray exposure).