

Electronic Supplementary Information (ESI)

Probing the degradation and homogeneity of embedded perovskite semiconducting layers in photovoltaic devices by Raman Spectroscopy

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Table S1 Device parameters of the MAPI solar cell.

Scan	V_{OC} (V)	J_{SC} (mA/cm ²)	FF (%)	Efficiency (%)
Reverse	0.79	21.37	70.11	11.84
Forward	0.78	20.83	65.80	10.67

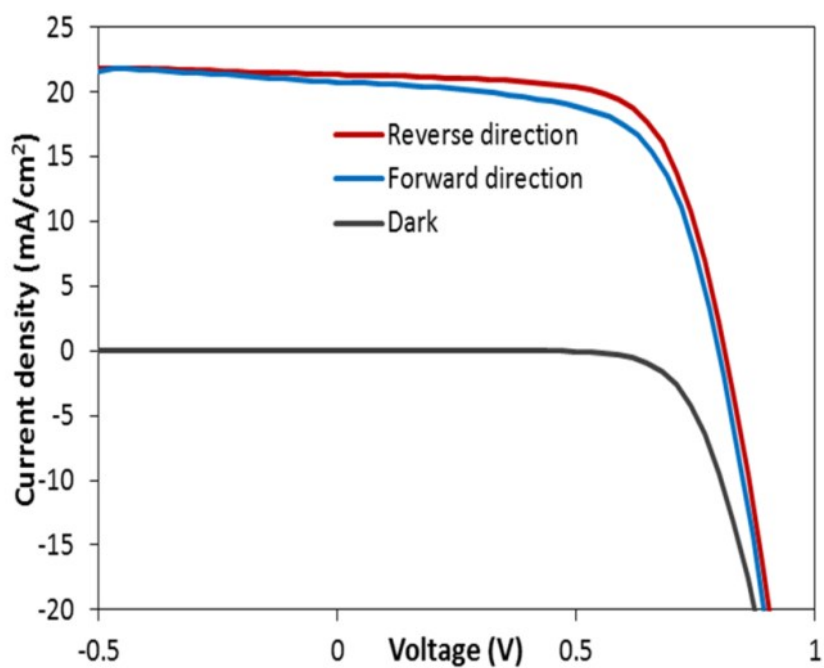


Fig. S1 J-V curves of the MAPI solar cell.

Table S2 Average device parameters and their standard deviations for 30 MAPI devices.

Scan	V_{OC} (V)	J_{SC} (mA/cm ²)	FF (%)	Efficiency (%)
Reverse	0.79	19.16	68.87	10.38
Stdev	0.03	1.80	2.96	1.27
Forward	0.77	18.48	65.28	9.33
Stdev	0.03	1.75	2.89	1.08

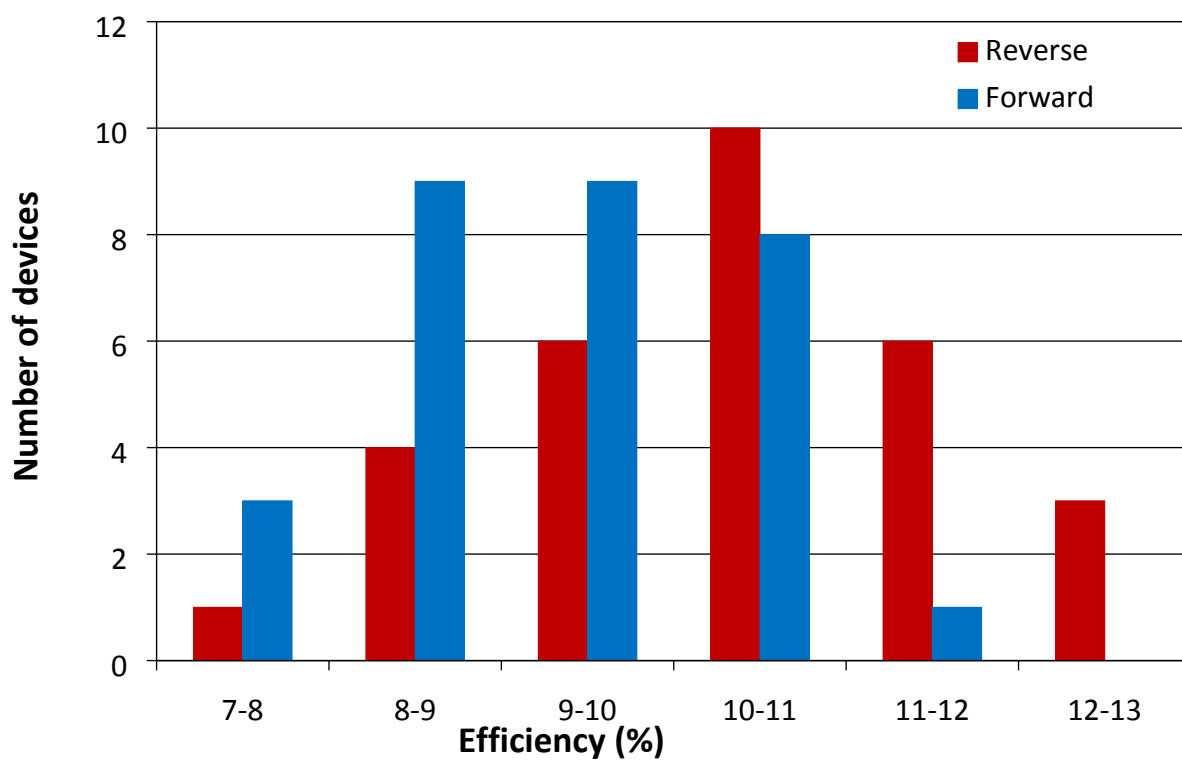


Fig. S2 A histogram showing the distribution of efficiencies from a batch of 30 devices.

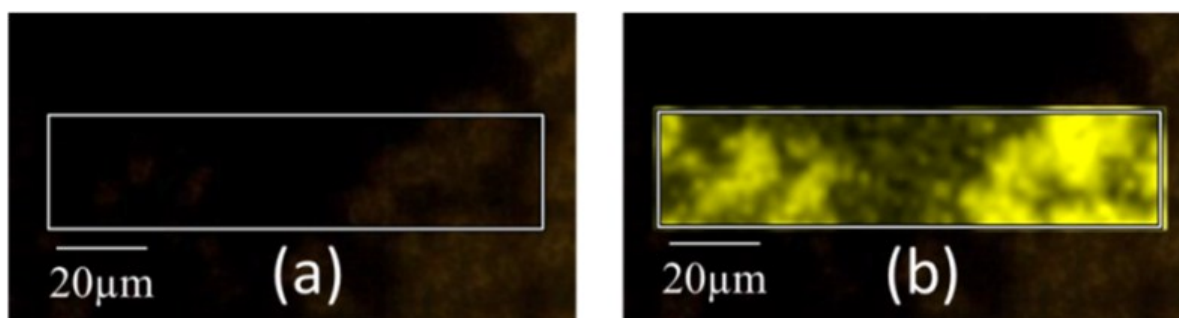


Fig. S3 (a) Optical image and (b) Raman map at 96cm⁻¹ (PbI₂) of an ambient aged CH₃NH₃PbI_{3-x}Cl_x (MAPIC) device with planar device structure. Probing conditions are: 0.3mW, 0.2s. Efficiency of fresh device is ~ 12%.