

Supporting Information

A Green Ionic Liquid Solvent for Additive-free, Efficient and Stable Bladed Perovskite Solar Cells in Ambient Condition

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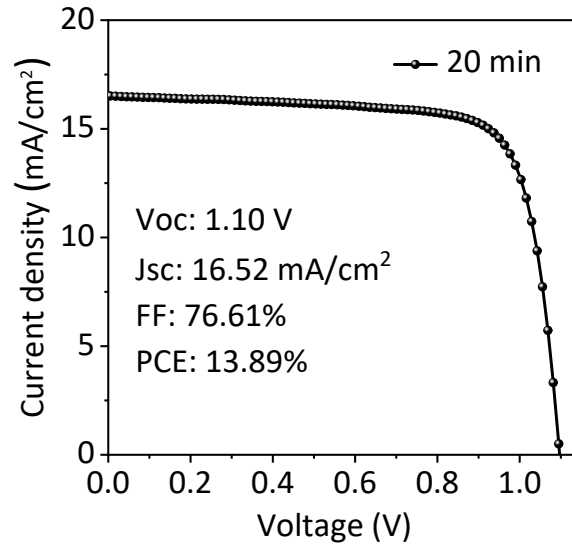


Figure S1. *J-V* curves of device annealed for 20 min

Table S1 Summary of precursor solutions, preparation environments, additives, PCE and stability of bladed perovskite films in this work and previously reported

Precursors	Solvents	Environment	Additives	PCE	Stability	Ref
MAPbI ₃ -based	DMF	N ₂	Without PAA	10.3%	40% (576 hrs)	1
			With PAA	14.9%	80% (576 hrs)	
FAMACs-based	GBL/DMSO/IPA	N ₂	Without 18C6	7.8%	/	2
			With 18C6	14.7%	/	
MAPbI ₃ -based	DMF/DMSO	Ambient environment	normal MAI	8.28%	/	3
			With excess MAI	10.92 %	/	
MAPbI ₃ -based	2-methoxyethanol	Dry air	Without PbCl ₂	6.69%	/	4
			With PbCl ₂	14.3%	/	
MAPbI ₃ -based	DMF/IPA	Ambient environment	Without additives	11.1%	90% (336 hrs)	5
MAPbI₃	MAAc	Ambient	Without	>14%	>80%	This

			additives		(1200 hrs)	work
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Reference

- [1] N. Li, F. Xu, Z. Qiu, J. Liu, X. Wan, X. Zhu, H. Yu, C. Li, Y. Liu, B. Cao, Sealing the domain boundaries and defects passivation by Poly(acrylic acid) for scalable blading of efficient perovskite solar cells, *Journal of Power Sources*, 426 (2019) 188-196. 10.1016/j.jpowsour.2019.04.041.
- [2] K-W. Huang, M-H. Li, P-T. Hsieh, C-F. Lin, R. Rajendran, Y-L. Tung, P. Chen, Role of crown ether in the perovskite precursor for doctor-bladed perovskite solar cells: investigation by liquid-phase scanning electron microscopy, *Journal of Materials Chemistry C.*, 10 (2022) 16016-16027. <https://doi.org/10.1039/D2TC02351B>
- [3] Y. Peng, Y. Cheng, C. Wang, C. Zhang, H. Xia, K. Huang, S. Tong, X. Hao, J. Yang, Fully doctor-bladed planar heterojunction perovskite solar cells under ambient condition, *Organic Electronics*, 58 (2018) 153-158. <https://doi.org/10.1016/j.orgel.2018.04.020>.
- [4] A. Marques, R. Faria, J. Freitas, A. Nogueira, Low-Temperature Blade-Coated Perovskite Solar Cells, *Industrial & Engineering Chemistry Research*, 60 (2021) 7145-7154. <https://doi.org/10.1021/acs.iecr.1c00789>
- [5] Q. Wang, M. Eslamian, T. Zhao, A. Jen, Achieving Fully Blade-Coated Ambient-Processed Perovskite Solar Cells by Controlling the Blade-Coater Temperature, *IEEE Journal of Photovoltaics*, 8 (2018) 1662-1669. 10.1109/JPHOTOV.2018.2861752.