Journal Name

RSCPublishing

ARTICLE

Supporting Information

Metallohalide perovskite-polymer composite film for hybrid planar heterojunction solar cells

Qifan Xue,† Zhicheng Hu,† Chen Sun, Ziming Chen, Fei Huang,*, Hin-Lap Yip,*, and Yong Cao

Institute of Polymer Optoelectronic Materials and Devices, State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Guangzhou 510640, P. R. China

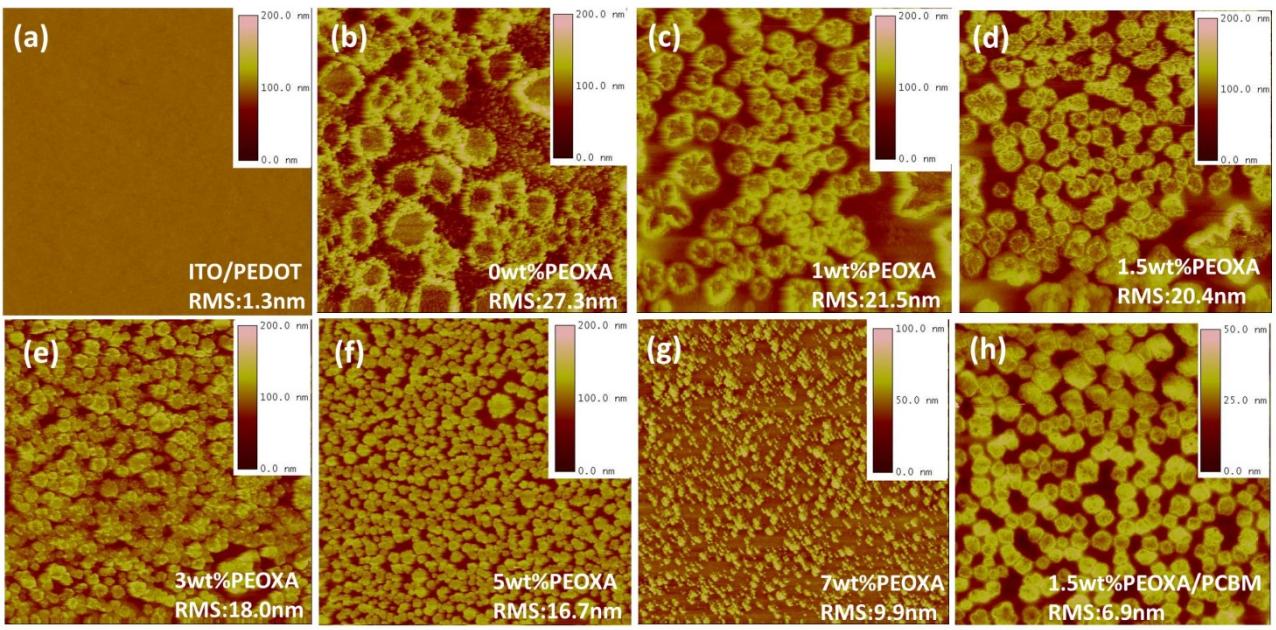

Figure S1. Topographic AFM images for $CH_3NH_3PbI_3$-PEOXA prepared from GBL solvent with increasing the weight percent of PEOXA and $CH_3NH_3PbI_3$-1.5wt% PEOXA /$PC_{61}BM$ film on the ITO/PEDOT:PSS substrate respectively. All the imagines are 20μm×20μm.

Table S1. The photovoltaic parameters of planar heterojunction solar cells based on the $CH_3NH_3PbI_xCl_{3-x}$-PEOXA composite film prepared from DMF with the different doping content of PEOXA(0wt% ,0.25wt%, 0.75wt%) from a batch of 40 devices.

	V_{oc}(V)	J_{sc}(mA/cm²)	FF(%)	PCE(%)
0wt%PEOXA	0.90±0.02	18.21±0.91	57.2±2.3	9.47±1.02
0.25wt%PEOXA	0.87±0.01	17.93±0.62	56.8±1.7	8.96±0.71
0.75wt%PEOXA	0.84±0.01	16.42±0.74	55.5±1.3	7.75±0.51

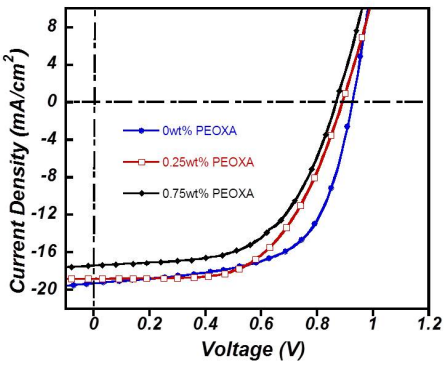

Figure S2 Current density–Voltage (J-V) characteristics for CH3NH3PbIxCl3-x-PEOXA composite film with increasing the weight percent of PEOXA in DMF solvent.

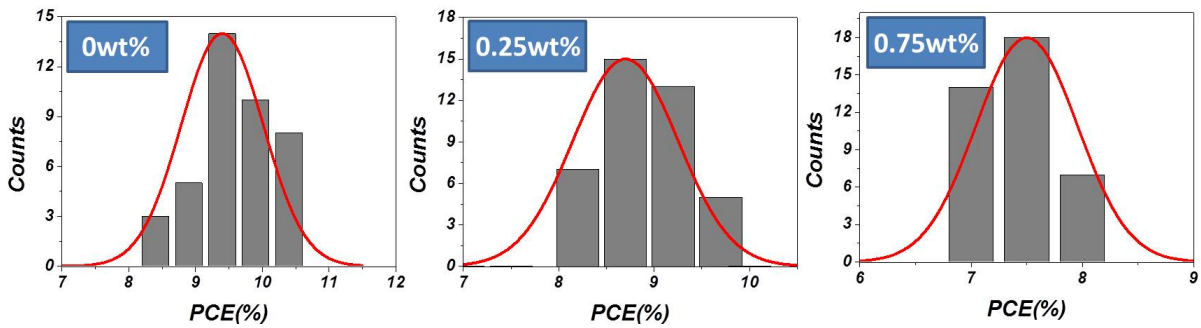

Figure S3. Histogram of solar cell efficiencies measured for 40 ITO/PEDOT:PSS/$CH3NH3PbCl_xI_{3-x}$-PEOXA/PCBM/Al devices with increasing the weight percent of PEOXA in DMF solvent.

Table S2. The photovoltaic parameters of planar heterojunction solar cells based on the masked and un-masked devices architecture.

	V_{oc}(V)	J_{sc}(mA/cm²)	FF(%)	PCE(%)
Masked device	1.05±0.02	8.70±0.16	63.7±2.4	6.10±0.15
Un-masked device	1.03±0.03	8.64±0.14	64.2±1.6	6.00±0.14

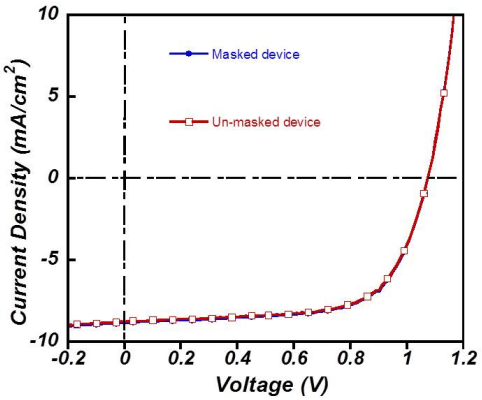

Figure S4 Current density–Voltage (*J-V*) characteristics for planar heterojunction solar cells based on the masked and un-masked devices architecture.

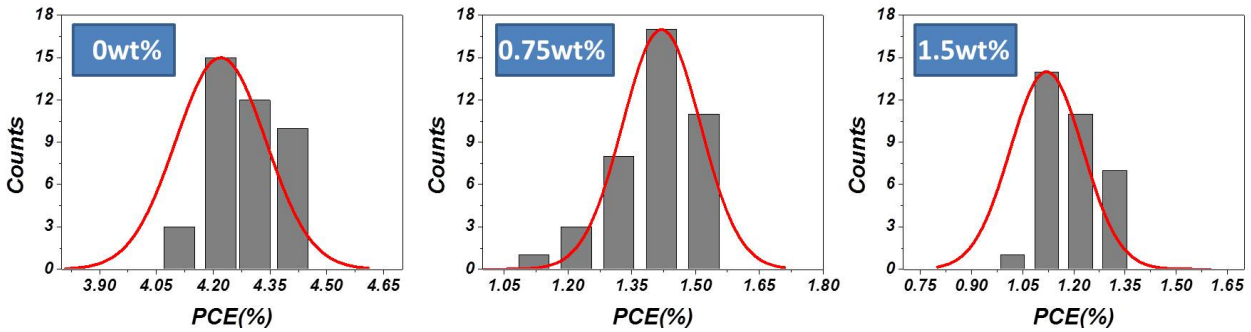

Figure S5. Histogram of solar cell efficiencies measured for 40 ITO/PEDOT:PSS/Perovskite-PEOXA/PCBM/Al devices with increasing the weight percent of PEOXA in DMF solvent.

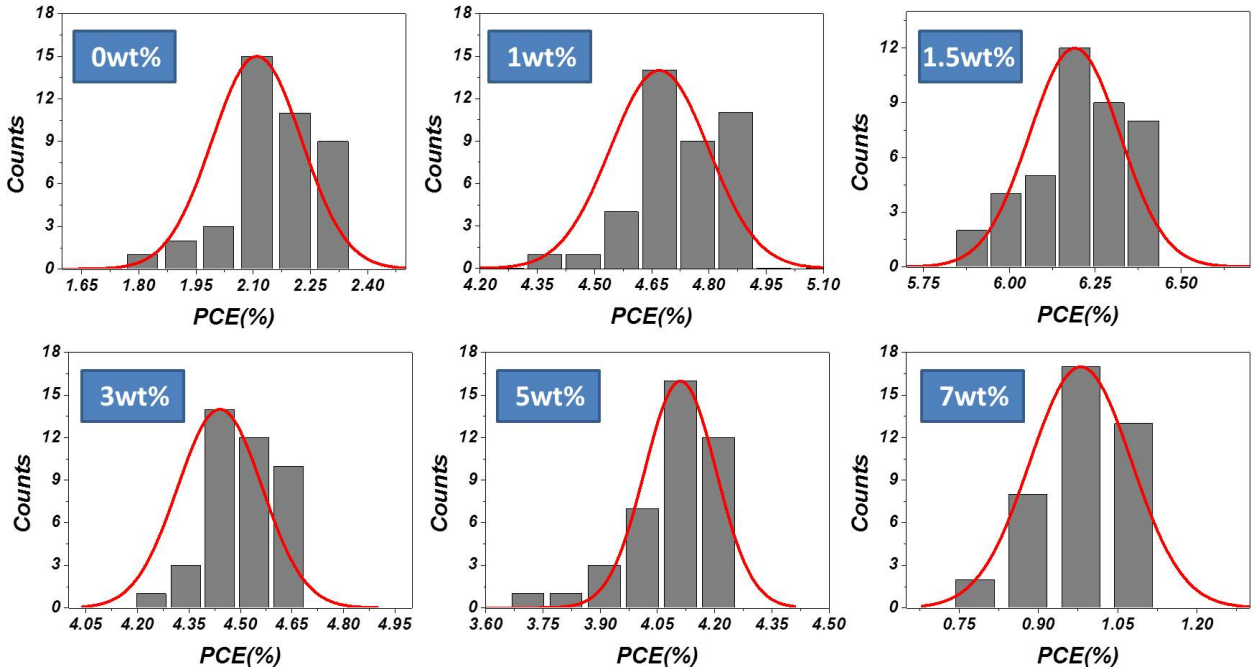

Figure S6. Histogram of solar cell efficiencies measured for 40 ITO/PEDOT:PSS/Perovskite-PEOXA/PCBM/Al devices with increasing the weight percent of PEOXA in GBL solvent.

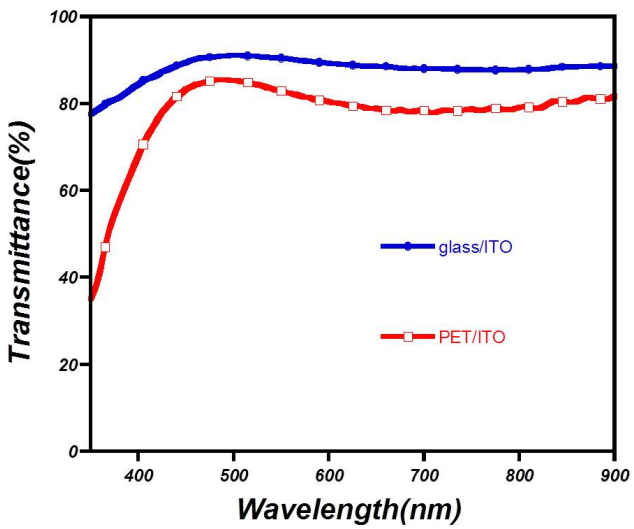

Figure S7. The optical transmittance of the Glass/ITO substrate together with the PET/ITO substrate