Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Electronic Supplementary Information

Room-Temperature Solution-Processed Molybdenum Oxide as Hole Transport Layer with Ag Nanoparticles for Highly Efficient Inverted Organic Solar Cells

Xinchen Li,[a] Wallace Chikho Choy,*[a] Fengxian Xie,[a] Shaoqing Zhang[b] and Jianhui Hou[b]

[a] *Department of Electrical and Electronic Engineering, The University of Hong Kong, Pokfulam Road, Hong Kong, China.*
[b] *Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, China.*
** Corresponding author: chchoy@eee.hku.hk (Choy)*

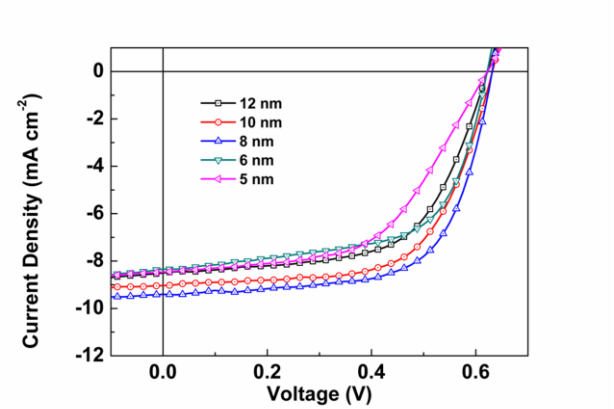

Fig. S1 J-V characteristics of P3HT:PCBM OSCs with different thicknesses of solution-processed MoO_x interfacial layer.

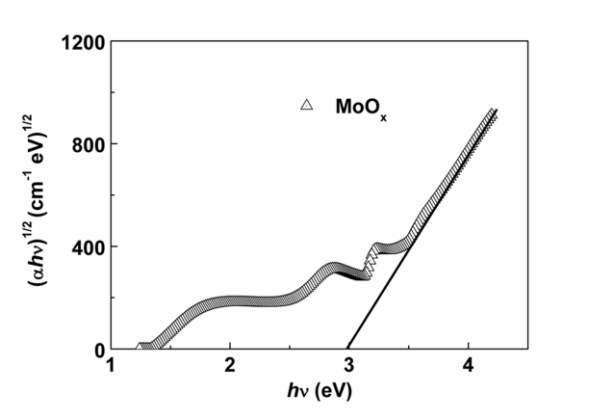

Fig. S2 The plot of $(\alpha h\nu)^{1/2}$ verse photon energy ($h\nu$) of pristine MoO_x, where α is absorption coefficient. The intersection of tangent with energy axis is the E_{opt}.

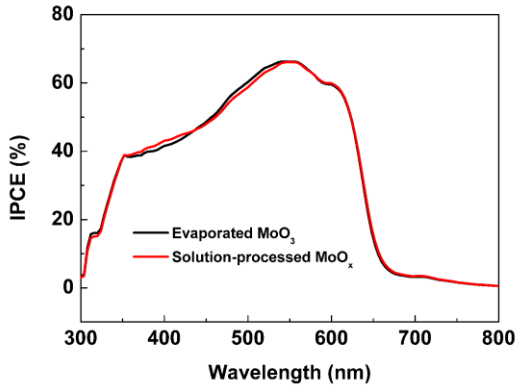

Fig. S3 IPCE spectra of P3HT:PCBM OSCs with thermally evaporated MoO_3 film (black line) and solution-processed MoO_x film (red line).

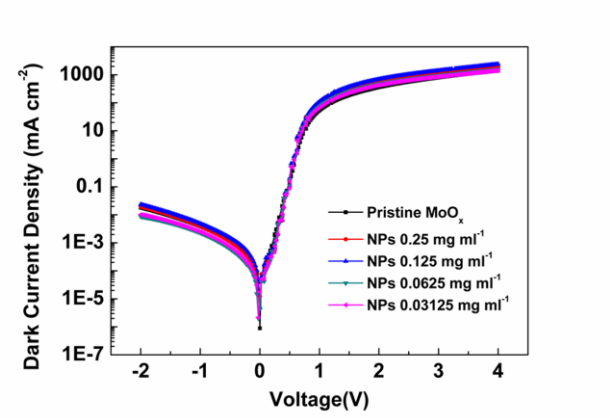

Fig. S4 J_{dark}-V characteristics of P3HT:PCBM OSCs with different weight ratios of Ag NPs in the Ag NP-MoO_x composite film.

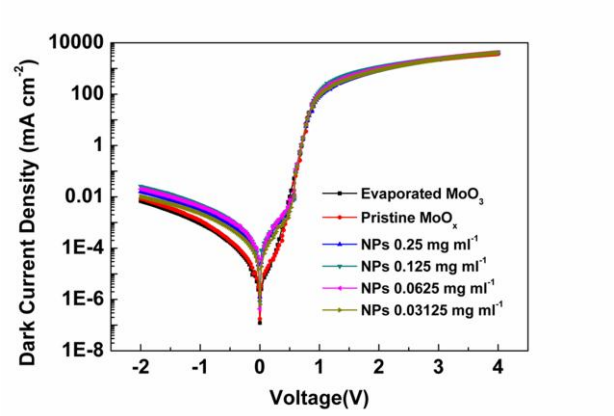

Fig. S5 J_{dark}-V characteristics of PBDTTT-C-T:$PC_{71}BM$ OSCs with different weight ratios of Ag NPs in the Ag NP-MoO_x composite film.

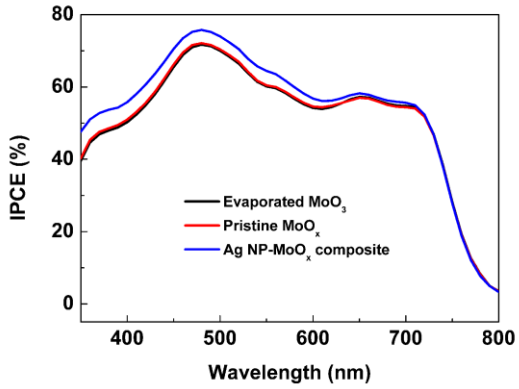

Fig. S6 IPCE spectra of PBDTTT-C-T:$PC_{71}BM$ OSCs with different MoO_x interfacial layers.

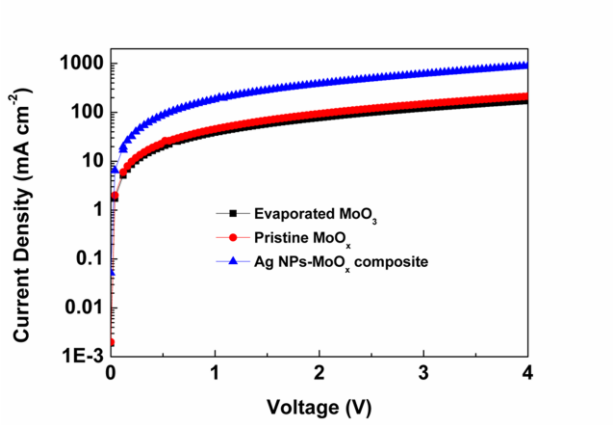

Fig. S7 J-V characteristics of hole dominated devices with evaporated MoO_3 film, pristine MoO_x film and Ag NP-MoO_x composite film. The device structure is ITO/ PEDOT:PSS/ P3HT:PCBM/MoO_x/Ag.

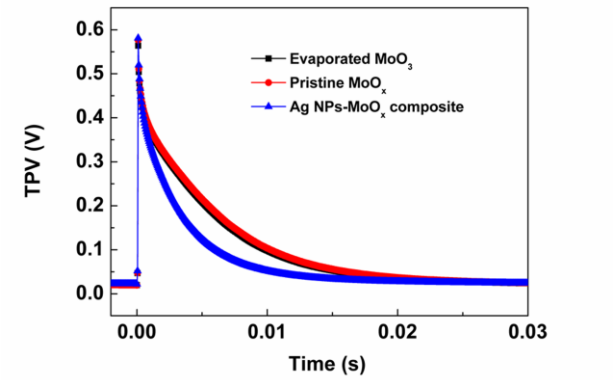

Fig. S8 TPV of P3HT:PCBM OSCs with evaporated MoO_3 film, pristine MoO_x film and Ag NP-MoO_x composite film. The device structure is ITO/TiO_2/P3HT:PCBM/ MoO_x/Ag.

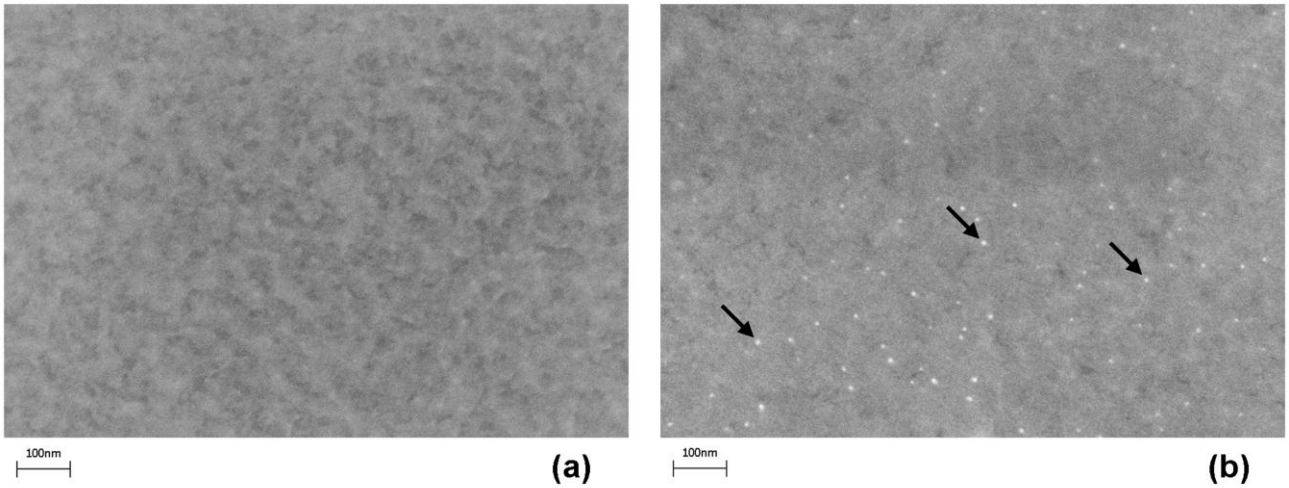

Fig. S9 Field-emission scanning electron microscope (FE-SEM) images of (a) pristine MoO_x coated onto P3HT:PCBM blend active layer, (b) Ag NP-MoO_x composite film coated onto P3HT:PCBM blend active layer. The scale bars are 100 nm. The arrows point out some of the silver nanoparticles in the composite film.