Supporting Information for

An organic cathode for low-temperature processed, flexible ternary organic solar cells with high-performance†

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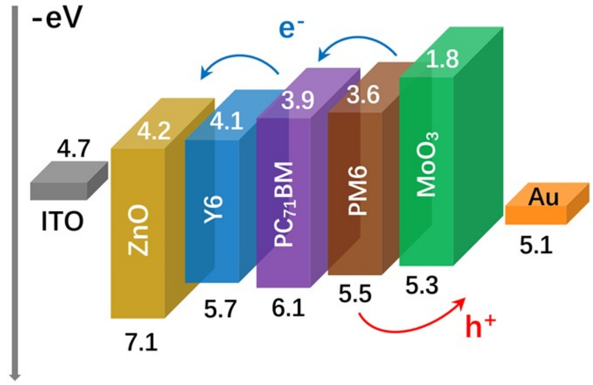

Figure S1. Energy level alignment of the functional layers involved in the control OSCs with a structure of ITO/ZnO/PM6:$PC_{71}BM$:Y6/MoO_3/Au.

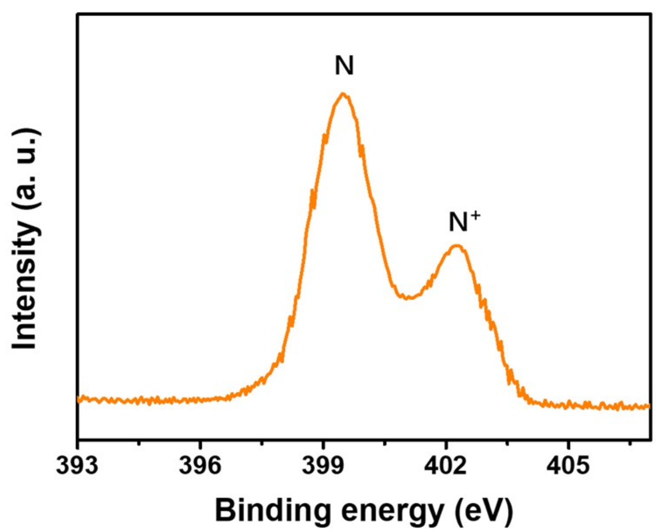

Figure S2. N1s response of the XPS spectrum for the PEDOT:PSS/PEIE electrode.

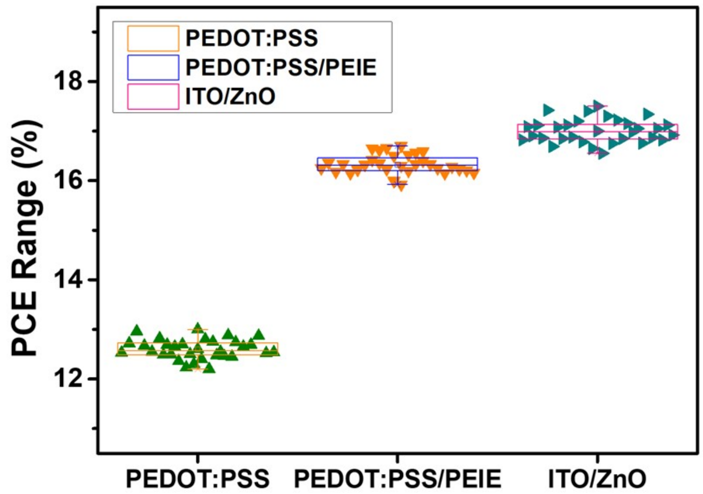

Figure S3. Statistical PCE distributions for 32 inverted OSCs based on bare PEDOT:PSS, PEDOT:PSS/PEIE and ITO/ZnO (control) at the cathode side.

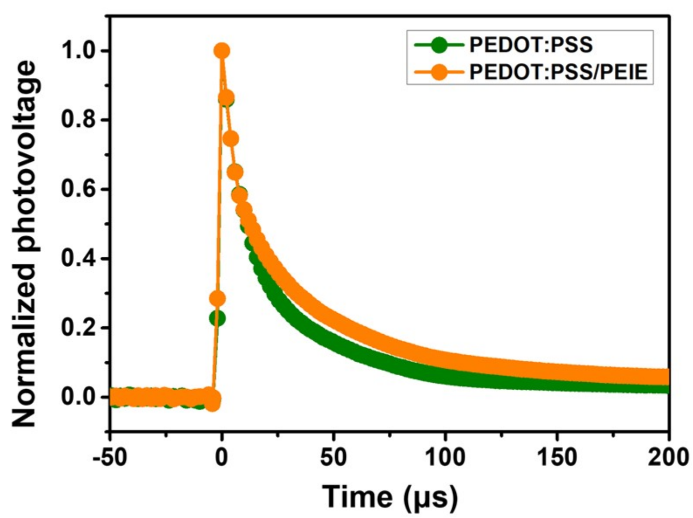

Figure S4. Transient photovoltage performance of the ternary OSCs using bare PEDOT:PSS or PEDOT:PSS/PEIE as the cathode.

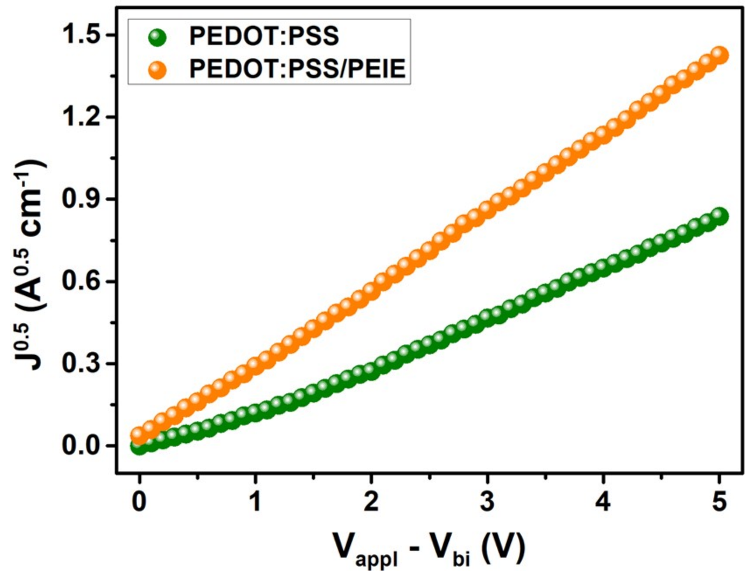

Figure S5. *J–V* characteristics for the electron-only devices with electrodes of PEDOT:PSS and PEDOT:PSS/PEIE.

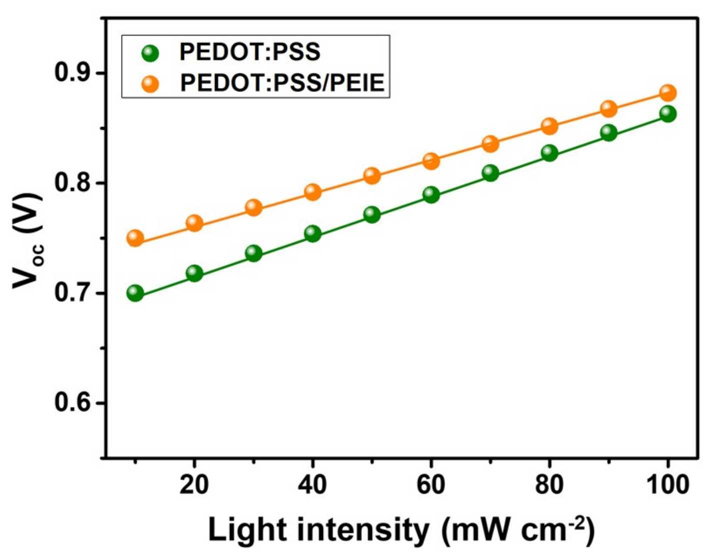

Figure S6. Light intensity dependence of V_{oc} of the OSCs using PEDOT:PSS and PEDOT:PSS/PEIE as the cathodes.

Table S1. Thickness and sheet resistance for as-casted PEDOT:PSS, acid treated PEDOT:PSS and ITO electrodes.

Electrode	Thickness (nm)	Sheet resistance (Ω sq^{-1})
As-casted PEDOT:PSS	50	1081
Acid treated PEDOT:PSS	47	83
ITO	185	20

Electron mobility measurement

The electron mobility was measured following the space-charge limited current approach. The electron-only device was fabrication using the following architecture [PEDOT:PSS or PEDOT:PSS/PEIE/PM6:$PC_{71}BM$:Y6/LiF/Al]. The *J–V* characteristics for electron-only devices were measured in dark conditions. The mobility was calculated from the *J–V* characteristics following Mott–Gurney law:[1]

$$J = \frac{9\varepsilon_0\varepsilon_r\mu(V - V_{bi})^2}{8L^3} \quad (1)$$

where J is the current density, ε_0 is the permittivity of free space, ε_r is the relative dielectric constant of the organic active layer, V is the applied voltage, V_{bi} is the built-in voltage, μ is the electron mobility, and L is the thickness of the active layer.

Reference

1 Y. Sun, J. H. Seo, C. J. Takacs, J. Seifter, and A. J. Heeger, *Adv. Mater.* 2011, **23,** 1679–1683.