

Electronic Supplementary Information (ESI) available: [SEM images and Transmittance of PEDOT nanostructures and Uv-vis spectra of active layer on different PEDOT buffer layers]

Electrochemically polymerized nanostructured
poly(3,4-ethylenedioxythiophene)- poly(styrenesulfonate) buffer layer for
high performance polymer solar cell

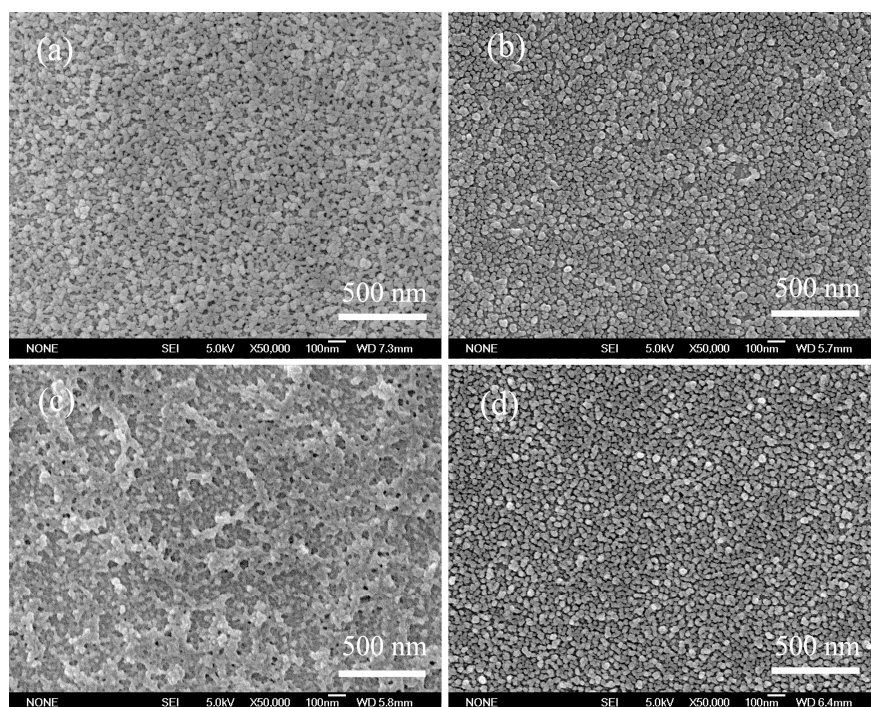


Figure S1. Large area FE-SEM images of PEDOT:PSS deposited on ITO substrates by electrochemical polymerization process under the experimental conditions of Table 1: a) A: b) B: c) C: d) D. Scale is 500 nm. Figure S1. indicates whatever the experimental condition, the surfaces of PEDOT:PSS by electrochemical polymerization are quite uniform on ITO substrate.

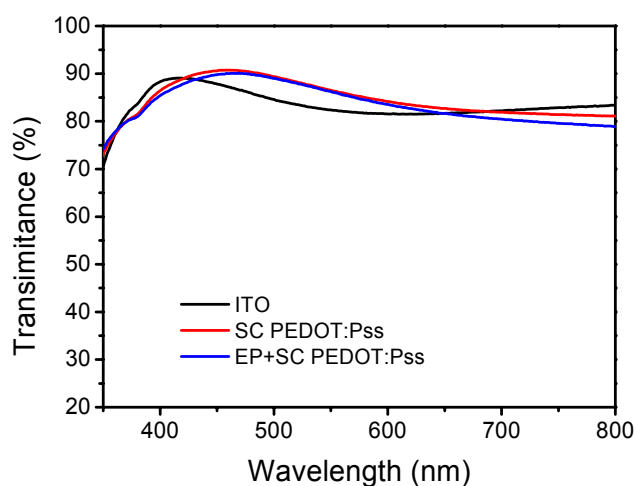


Fig. S2. Optical transmission spectra of different PEDOT:Pss layers on ITO/glass. Glass is included as the blank. Electrochemical polymerization of addition PEDOT:PSS layer was conducted at condition D.

The insertion of nanostructured PEDOT:PSS by electrochemical polymerisation between ITO and the spin-coated PEDOT:PSS layer has minor effect on transmittance. As it shown in figure S2, average transmittances in the region 350-800 nm about 82-84 % are measured for both spin-coated PEDOT:PSS layer and nano-structured PEDOT:PSS+ spin-coated PEDOT:PSS layers.

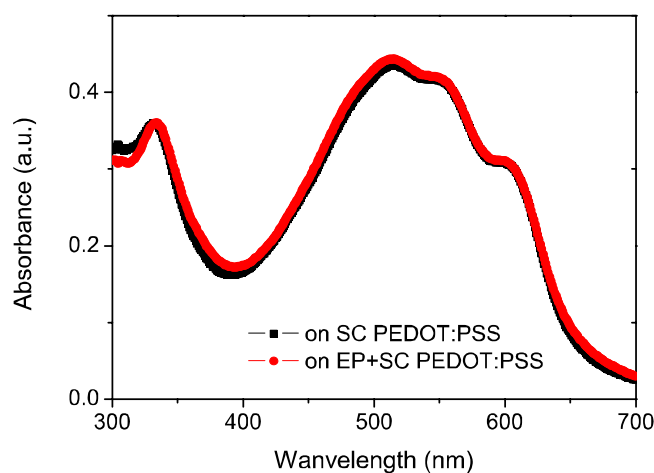


Figure S3. UV-visible spectra of P3HT:PCBM films spin-coated on ITO substrate with two kinds of PEDOT:PSS buffer layers. Electrochemical polymerization of addition PEDOT:PSS layer was conducted at condition D. The P3HT:PCBM films were annealed at 150 °C for 20 min.