Supporting Information

Anisotropic highly-conductive films of poly(3-methylthiophene) from epitaxial electropolymerization on oriented poly(vinylidene fluoride)

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Characterization

The optical microscopy images were obtained by using the Axioskop 40A Pol optical microscope (Carl Zeiss). The surface morphology was studied by using an Agilent Technologies 5500 atomic force microscope (Agilent Technologies Co. Ltd., U.S.) at room temperature in air. The images were obtained by means of tapping mode (height and phase) with a silicon cantilever having a spring constant of 20-30 N/m and a resonating frequency of 320-350 kHz, and the scanning rates varied from 2 to 5 μm/s. For transmission electron microscopy (TEM) examination, the P3MT crystal films were detached from the substrate glass slide with the help of poly(acrylic acid) (PAA)[1] and mounted onto 400 mesh TEM copper grids without any further thermal treatment. TEM observations were performed using a JEOL JEM-2100 with an accelerating voltage of 200 kV. Gel permeation chromatography (GPC) analysis was carried out on a Waters 515-2410 system using polystyrene standards as molecular weight references and tetrahydrofuran (THF) as the eluent. X-ray photoelectron spectroscopy (XPS) data were obtained with an ESCALab220i-XL electron spectrometer from VG Scientific using 300 W Mg-Ka radiation. The base pressure was about 3×10^{-9} mbar. The binding energies were referenced to the C1s line at 284.8 eV from adventitious carbon. The fitting of the curves was made by Avantage 3.95. X-Ray diffraction (XRD) measurements were performed on a Rigaku D/max 2400 diffractometer with Cu-Kα radiation

at a scanning rate 5 ^{o}C/min.

Supporting figures

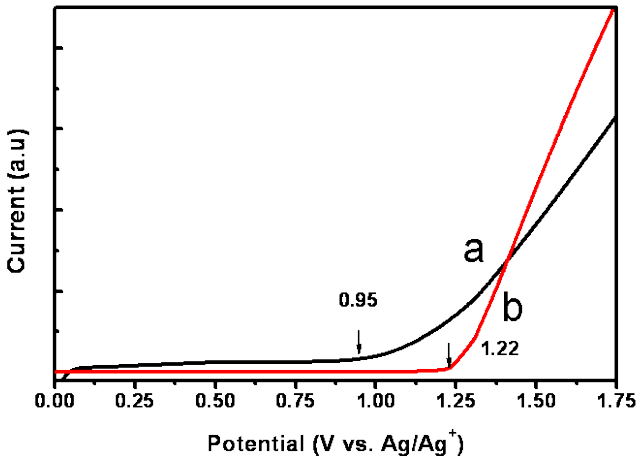

Fig. S1. Anodic polarization curves of 3-methylthiophene: (a) on ITO and (b) on PVDF modified ITO.

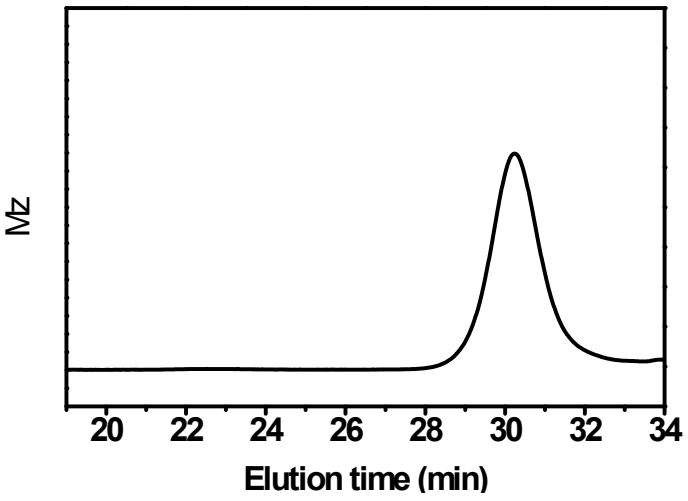

Fig. S2. GPC curve of P3MT prepared by electrodepositon on PVDF modified ITO.

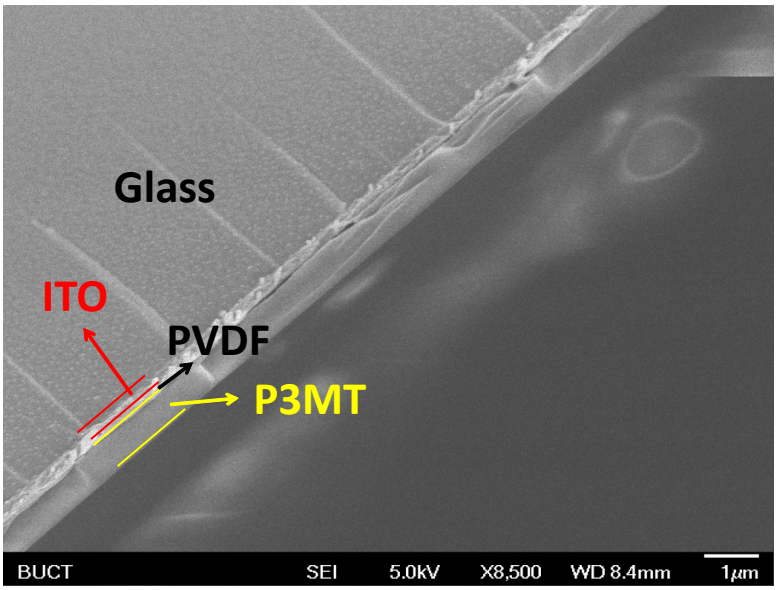

Fig. S3. A scanning electron microscopy (SEM) image of the glass-ITO-PVDF-P3MT assembly.

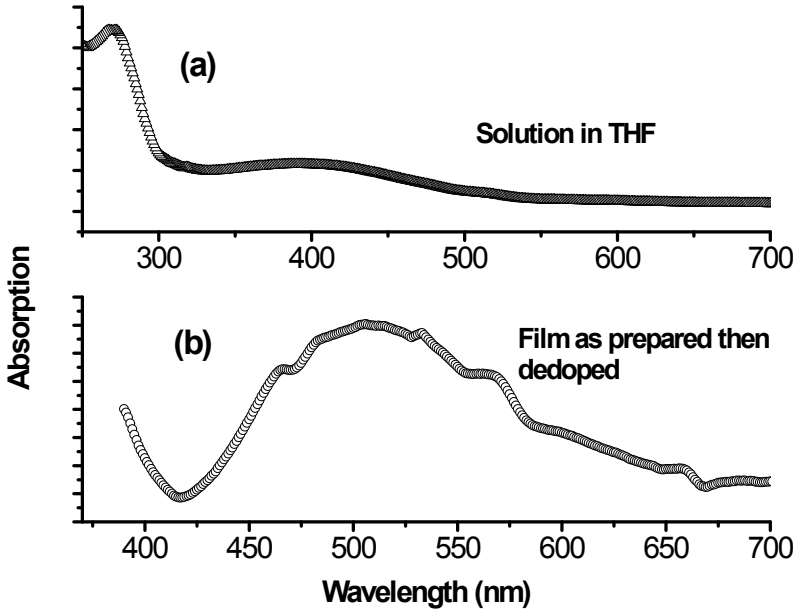

Fig. S4. UV-Vis absorption spectra of (a) the portion of the dedoped P3MT film dissolved in THF and (b) the as-prepared P3MT film after dedoping.

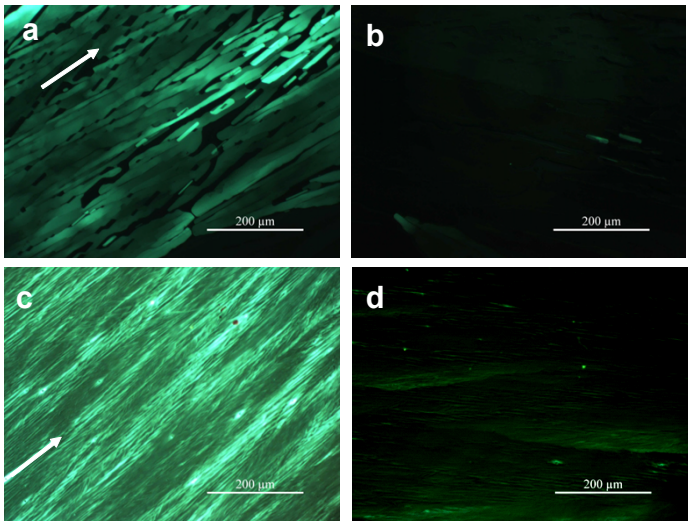

Fig. S5. Polarized optical micrographs of (a,b) polythiophene (PT) and (c,d) poly(3-hexylthiophene) (P3HT) films electrodeposited onto ITO glass covered with oriented PVDF film and then dedoped. The arrows indicate the stretching directions of the PVDF films during preparation, which is 45° (a,c) and 0° (b,d) apart from the polarizer direction. The deposition conditions were 40 mV/s, 50 cycles.

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[1] H. Zhou, S. Jiang, S. Yan, *J. Phys. Chem. B,* 2011, **115**, 13449-13454.