Supporting Information

N-type Doping for Efficient Polymer Electron-transporting Layers in Perovskite Solar Cells

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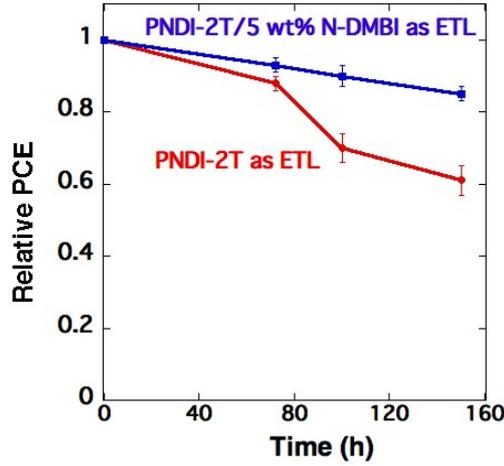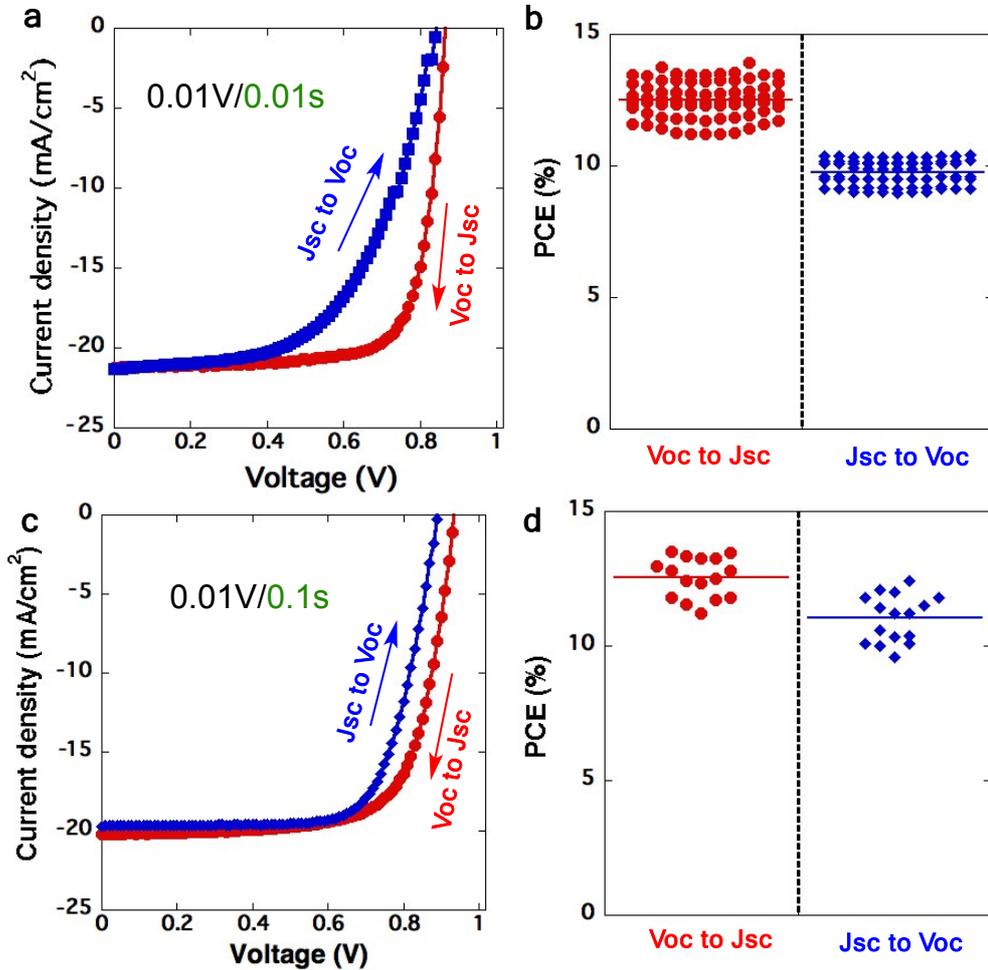
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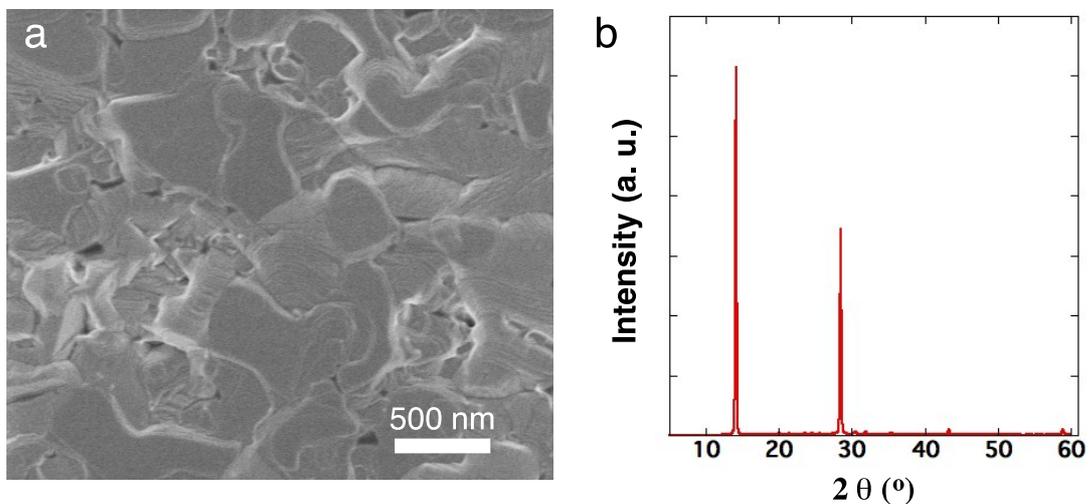
Figure S1. Morphology and X-ray diffraction analysis based perovskite films on PEDOT:PSS surface.
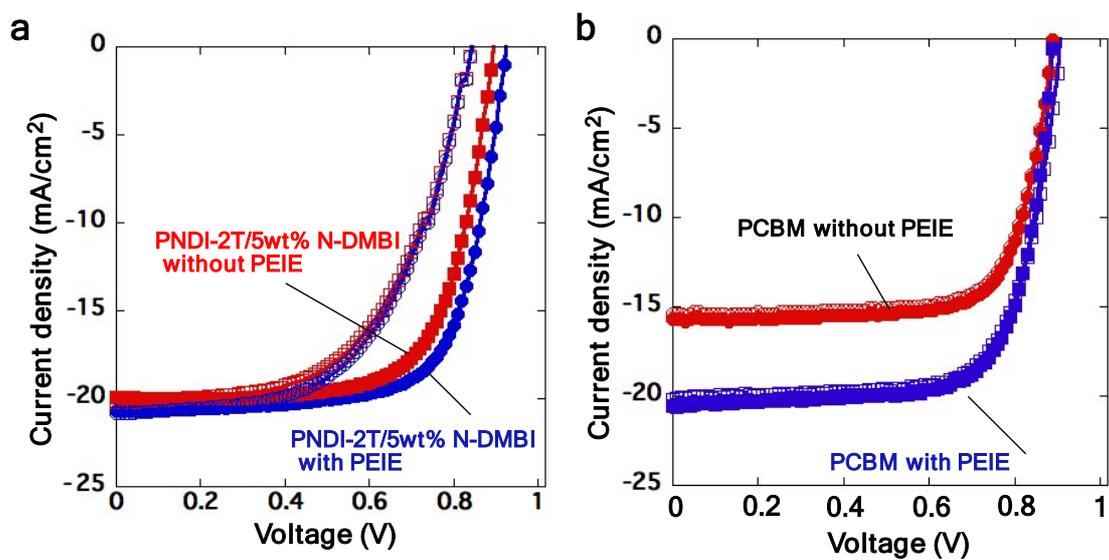
Figure S2. The effects of PEIE in the solar cells (a) with PNDI-2T/0.5 wt%N-DMBI as ETL and (b) with PCBM as ETL. Scanning rate is 0.01V/0.01s.

Figure S3. Comparing the stability of devices with doped ETL (blue) and nondoped ETLs (red).

Figure S4. J-V characteristics of solar cell scanning forward and reverse. (a) Typical J-V curves of the solar cell scanning forward (red) and reverse (blue) with a scan rate of 0.01V/0.01s. (b) PCE distribution of 70 devices with ETL of PNDI-2T/0.5 wt% N-DMBI scanning forward (red) and reverse (blue). (c) Typical J-V curves of the solar cell scanning forward (red) and reverse (blue) with a scan rate of 0.01V/0.1s. (d) PCE

distribution of 15 devices with ETL of PNDI-2T/0.5 wt%N-DMBI scanning forward (red) and reverse (blue).
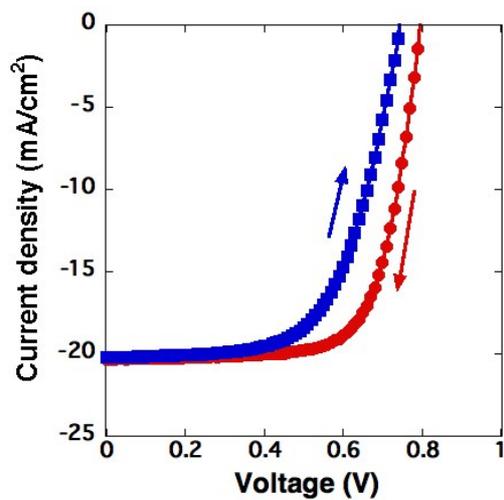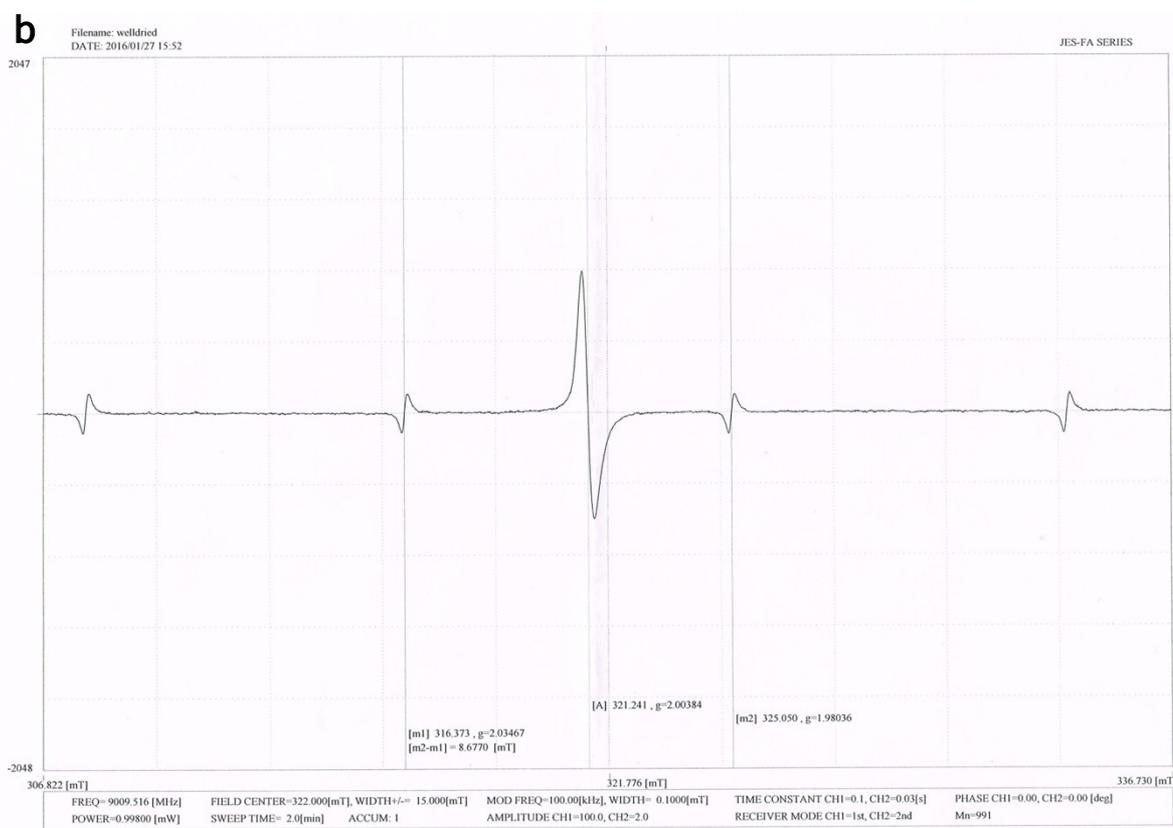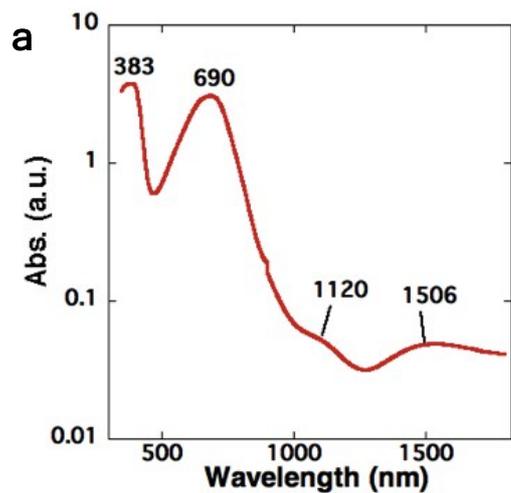

Figure S5. J-V curves of solar cell with about 14 nm PNDI-2T/0.5wt% N-DMBI as ETL under a scan rate of 0.01V/0.01s.

Figure S6. UV-vis spectrum (a) and electron spin resonance spectroscopy (ESR) (b) based on PNDI-2T/0.5 wt%N-DMBI materials from slow-drying the solution.